

# 2008 BUILDING ENERGY EFFICIENCY STANDARDS

CALIFORNIA  
ENERGY  
COMMISSION

## COMMISSION MANUAL



# NONRESIDENTIAL COMPLIANCE MANUAL

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Arnold Schwarzenegger  
Governor

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# 2008 Second Quarter Revision Summary of Pages for Nonresidential Compliance Manual August 1, 2010

SUMMARY OF CHANGE	CHAPTER/FORM	PAGE	PAGES REPLACED
Updated Table of Contents	TOC	All	All
Clarification on garages and sheds on third bullet; Note on U occupancies in Table 1-1	Introduction	1-10	1-9, 10
Add LTG-3A reference to second paragraph	5.7.1.1	5-112	5-111,112
Add LTG-3A reference to first paragraph	5.7.3	5-126	5-125,126
New Chapter 7	7	All	All
Added explanation to determine Saturated Condensing Temperature for compound refrigerants	8.3.3	8-13	8-13,14
Add LTG-3A and NA 7.6.1 reference to Indoor Lighting	Table 10-1	10-11	10-11,12
Add LTG-3A to list of Acceptance forms	Appendix A	Summary	Summary
Fixed various footnotes	ENV 3-C	3 of 6	3 of 6
Add LTG-3A next to LTG-2A reference	LTG-1C	2 of 4, 4 of 4	2 of 4, 4 of 4
New LTG-3A Form	LTG-3A	All	All
Correct form reference under block C from LTG-2A to OLTG-2A	OLTG-1C	3 of 4	3 of 4
New MECH-1C-ALT-HVAC Form	MECH-1C-ALT-HVAC	All	All
Change Column L to 300 cfm	MECH-3C	MECH-3C	MECH-3C
Correct Intent statement to TES systems	MECH-15A	2 of 3	2 of 3
New SLTG-1C Form	SLTG-1C	All	All

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directly or indirectly conditioned must only meet the indoor and outdoor lighting requirements of the Standards.

The Standards do not apply to CBC Group I. This group includes such buildings as hospitals, daycare, nursing homes, and prisons. The Standards also do not apply to buildings that fall outside the jurisdiction of California Building Codes, such as mobile structures. If outdoor lighting is associated with a Group I occupancy, it is exempt from the Standards requirement; however, if the outdoor lighting is part of any of occupancy groups listed above, it must comply with the Standards requirements.

### ***Historic Buildings***

Exception 1 to §100(a) states that qualified historic buildings, as regulated by the California Historical Building Code Title 24, Part 8 or California Building Code, Title 24, Part 2, Volume I, Chapter 34, Division II are not covered by the Standards. §146(a)3Q and §147 Exception 14 clarify that indoor and outdoor lighting systems in qualified historic buildings are exempt from the lighting power allowances only if they consist solely of historic lighting components or replicas of historic lighting components. If lighting systems in qualified historic buildings contain some historic lighting components or replicas of historic components, combined with other lighting components, only those historic or historic replica components are exempt. All other lighting systems in qualified historic buildings must comply with the Standards.

The California Historical Building Code (CHBC) Section 102.1.1 specifies that all non-historical additions must comply with the regular code for new construction, including the Standards. CHBC Section 901.5 specifies that when new or replacement mechanical, plumbing, and/or electrical (including lighting) equipment or appliances are added to historic buildings; they *should* comply with the Standards, including the Appliance Efficiency Regulations.

The California State Historical Building Safety Board has final authority in interpreting the requirements of the CHBC and determining to what extent the requirements of the Standards apply to new and replacement equipment and other alterations to qualified historic buildings. It should be noted that in enacting the State Historical Building Code legislation, one of the intents of the Legislature was to encourage energy conservation in alterations to historic buildings (Health and Safety Code Section 18951).

Additional information about the CHBC can be found on the following website:

<http://www.dsa.dgs.ca.gov/StateHistoricalBuildingSafetyBoard/>

Contact the State Historical Building Safety Board at (916) 445-7627.

### ***Low-rise Residential Buildings***

The Residential Standards cover single-family and low-rise residential buildings (occupancy groups R1, R2, and R3) and CBC Group U buildings including:

- All single-family dwellings of any number of stories
- All duplex (two-dwelling) buildings of any number of stories



- All multi-family buildings with three or fewer habitable stories above grade (Groups R 1 and R-2)
- Additions and alterations to all the above buildings
- Residential garages for less than 8 vehicles, sheds on residential sites, and agricultural buildings

*Table 1-1 – Nonresidential vs. Residential Standards*

Nonresidential Standards	Residential Standards
These Standards cover all nonresidential occupancies (Group A, B, E, F, H, M, R, S or U), as well as high-rise residential (Groups R-1 and R-2 with four or more habitable stories), and all hotel and motel occupancies.	Note: U occupancies (i.e. sheds) may be on either Residential or Nonresidential sites. These Standards cover all low-rise residential occupancies including:
Offices Retail and wholesale stores Grocery stores Restaurants Assembly and conference areas Industrial work buildings Commercial or industrial storage Schools and churches Theaters Hotels and motels Apartment and multi-family buildings, and long-term care facilities (Group R-2), with four or more habitable stories	All single family dwellings of any number of stories (Group R-3) All duplex (two-dwelling) buildings of any number of stories (Group R-3) All multi-family buildings with three or fewer habitable stories above grade (Groups R-1 and R-2) Additions and alterations to all of the above buildings Lighting requirements for dwelling units in high-rise multifamily buildings (over 3 stories) and in hotels/motels
<i>Note:</i> The Standards define a habitable story as one that contains space in which humans may live or work in reasonable comfort, and that has at least 50% of its volume above grade.	

#### 1.7.4 Scope of Improvements Covered

The Standards apply to any new construction that requires a building permit, whether for an entire building, for outdoor lighting systems, for signs, or for a modernization. The primary enforcement mechanism is through the building permitting process. Until the enforcement agency is satisfied that the building, outdoor lighting, or sign complies with all applicable code requirements, including the Standards, it may withhold the building permit (or, after construction, the occupancy permit).

The Standards apply only to the construction that is the subject of the building permit application (with the exception of existing spaces that are "conditioned" for the first time, in which case existing envelope components, and existing lighting systems, whether altered or not, must also show compliance with the Standards).

Other than for lighting, the Standards apply only to buildings that are directly or indirectly conditioned by mechanical heating or mechanical cooling. Section 1.7.177 provides detailed definitions of these terms.

#### 1.7.5 Speculative Buildings

##### **Known Occupancy**

Speculative buildings of known occupancy are commonly built by developers. For example, if a big box retail center or an office building were built on speculation,

**F: NUMBER OF LUMINAIRES** is the number of identical luminaires in the space.

**G: INSTALLED WATTS** is total installed watts for identical luminaire installed in the space, which is the product of WATTS PER LUMINAIRE and NUMBER OF LUMINAIRES (Columns C X F).

After the page has been completed, all of the installed watts in Column G shall be added up and shown in the Page Total cell.

**H: FIELD ISNPSECTOR** is to verify if the items listed in the lighting schedule are equal to what was installed.

BUILDING TOTAL NUMBER OF PAGES indicates when multiple lighting schedules are present.

BUILDING TOTAL is the sum of all page totals. The sum is also to be entered into Part 4 of the LTG-1C.

If more than one page of LTG-1C (Page 2 of 4) is needed, list the Building total number of pages that were used in the appropriate cell at the bottom of the page. Add up all of the Column G page totals, and list as the Building Total (Sum of all pages).

#### ***LTG-1C Page 3 of 4 – Mandatory Lighting Controls Schedule and Field Inspection Energy Checklist***

LTG-1C, Part 3 of 4 is required to show compliance with the mandatory lighting control requirements, and serves two separate functions:

1. To describe and document the mandatory lighting controls.
2. As a Field Inspection Energy Checklist to be utilized by the enforcement agency. The Field Inspector verifies at the end of installation that the LTG-1-INST and the appropriate Certificates of Acceptance have been completed. The Field Inspector also verifies that lighting control schedule describes what was installed and checks the appropriate box
  - **CONTROL TYPE/DESCRIPTION** lists the type of certified control device used to meet the control requirement. Such controls include occupant, daylight, dimming sensors etc. The type should use the same name as shown on the plans.
  - **NUMBER OF UNITS** is the number of controls of the same type.
  - **LOCATION IN BUILDING** indicates the room or space the control is to be used and should be named the same as shown on the plans.

The Field Inspector also verifies that lighting schedule describes what was installed and checks the appropriate box in the column.

The space entitled **SPECIAL FEATURES INSPECTION CHECKLIST** is provided for listing specific features of the design that required special written justification, documentation and verification.

### ***LTG-1C Page 4 of 4 – Indoor Lighting Power for Conditioned and Unconditioned Spaces***

The indoor lighting power calculations are to be separate between conditioned and unconditioned spaces. Trade-offs between the two spaces is not allowed.

- **INSTALLED LIGHTING** is total amount of watts calculated on Page 2 of the LTG-1C for either conditioned or unconditioned space as checked on Page 2 of LTG-1C
- **LIGHTING CONTROL CREDIT** is the amount watts calculated on the LTG-2C for either conditioned or unconditioned space as checked on LTG-2C
- **ADJUSTED INSTALLED LIGHTING POWER** is the difference between the **INSTALLED LIGHTING** and the **LIGHTING CONTROL CREDIT**. The result is the amount of lighting power compared to the **ALLOWED LIGHTING POWER** for compliance.
- **ALLOWED LIGHTING POWER** is calculated on the LTG-3C using the Complete Building, Area Category or Tailed Methods of compliance, for either conditioned or unconditioned space.

The designer must indicate in the space entitled **REQUIRED ACCEPTANCE TEST**, LTG-2A, and LTG-3A as to which of the installed equipment requires testing. A short description should be given of the equipment type, number of controls and the location of the building in which the system is installed.

#### **5.7.1.1 LTG-2C: Lighting Controls Credit Worksheet**

LTG-2C is used to report the lighting control credits for conditioned and unconditioned spaces. This worksheet is required whenever lighting control credits are claimed on LTG-1C (Page 4 of 4).

When certain types of automatic lighting controls are listed in Table 146-C (Power Adjustment Factors) in the Standards, a credit is permitted. This table also lists some restrictions that must be met in order to take credit for the controls. A separate worksheet must be completed for conditioned and unconditioned spaces. Check only one box as appropriate per page, for Conditioned Space, or for Unconditioned Space.

At least 50 percent of the light output of the luminaire must be within the applicable space for which the lighting control credit is claimed.

#### ***LTG-2C Page 1 of 2 – Lighting Control Credits for Non-Daylight Controls***

LTG-2C (Page 1 of 2) is used to report control credits allowed in Table 146-C which are not daylighting control credits. (Daylighting control credits are separately reported on page 2 of 2). The bottom of (Page 1 of 2) is also used to add together the non-daylight control credits plus the daylight control credits to determine the total lighting control credit available.

**A: ROOM #** – List the room where the control device is controlling luminaires.

**B: LIGHTING CONTROL DESCRIPTION** – List a description of the device that is consistent with the controls listed in Table 146-C.

rating of the track head, not the wattage of the bulb that is screwed into the track head. The Wattage of incandescent track heads shall be the maximum relamping rated wattage as listed on a permanent pre-printed factory-installed label according to §130(c)1. Luminaire wattage for fluorescent and high intensity discharge (HID) track heads shall be the operating input wattage of the rated lamp/ballast combination according to §130(c)2. Luminaire wattage for low-voltage track heads (when mounted on line-voltage track) shall be the maximum rated wattage of the transformer on each track head according to §130(c)5. Add up the wattage for every luminaire that will be installed on the identified track and enter the total amount as the rated wattage.

**F: WATTS INSTALLED** is the larger of column D or column E. This is the installed lighting power for the track listed in column A. Add up all of the numbers in column F and list the total at the bottom. Enter this number in the space provided in Page 2 of the LTG-5C.

***Method 3 – Use the Higher of: 12.5 watts per linear foot of track or the VA rating of the integral current limiter.***

If using this method to determine track or busway lighting power, check the box to the left of “Method 3.” Also, check the box to indicate that the integral current limiter has been certified to the Energy Commission.

This method may be used only for Track Lighting Integral Current Limiters which have been certified to the Energy Commission, and listed on the Energy Commission database of certified devices. Devices which have not been certified to the Energy Commission and other assembly of controls shall not qualify as Track Lighting Integral Current Limiters.

**A: TRACK NUMBER OF NAME** is the name or number that identifies the track lighting and should correspond to the plans.

**B: LINEAR FEET OF TRACK** is the length of track measured in linear feet.

**C: WATTS PER LINEAR FEET** is 12.5 W/lf. This number is required for using Method 3.

**D: WATTS CALCULATED** by multiplying the linear feet (column B) by the assumed watts per linear feet (column C).

**E: VA RATING** is the volt-ampere rating of the integral current limiter controlling the track or busway as specified in §130(d)3Biii

**F: WATTS INSTALLED** is the larger of column D or column E. This is the installed lighting power for the track listed in column A. Add up all of the numbers in column F and list the total at the bottom. Enter this number in the space provided at the bottom of the page.

***Method 4 – Dedicated Track Lighting Over Current Protection Panel.***

If using this method to determine track or busway lighting power, check the box to the left of “Method 3.” Also, all five of the following boxes shall be checked to document that the supplemental overcurrent protection panel complies with all of the required provisions in the Standards.

**A: NAME OR ID** is the description of the track lighting that corresponds to the plans.

**B: VOLTAGE OF THE BRANCH** is the total voltage of the branch described in column A.

**C: LIST OF AMPERAGE RATING** is the complete list of each device installed the panel for the branch described in column A.

**D: SUM OF THE AMPERE RATING** is the sum of the listed values from column C.

**E: WATTS INSTALLED** is the product of the voltage of the branch (column B) and the sum of the ampere ratings (column D). The total from column E should be entered on the appropriate space at the bottom of the form.

At the bottom of Page 2 of the LTG-5C, the total track/busway wattage is totaled for each of the compliance methods utilized, and this number shall be entered on the LTG-2C.

### 5.7.2 Installation Certificate

A new two-page form, LTG-INST, the Installation Certificate has been included in the Nonresidential Compliance Manual. This form includes general information about the project, a declaration statement, the responsible person's name and signature, and a table to identify all applicable construction documents for the scope of responsibility for the Installation Certificate.

§10-103(a)3 requires, for all buildings, the person with overall responsibility for construction or the person(s) responsible for the installation of features, materials, components or manufactured devices regulated by the Standards or the Appliance Efficiency Regulations shall submit Installation Certificate(s).

For all buildings, a copy of the Installation Certificate(s) shall be posted, or made available with the building permit(s) issued for the building, and shall be made available to the enforcement agency for all applicable inspections.

### 5.7.3 Certificate of Acceptance

Acceptance tests, LTG-2A, and LTG-3A are used to verify that lighting controls were installed and calibrated correctly. These tests require that a responsible party certify that controls are installed and calibrated properly. This responsible party is typically the contractor who installed the lighting controls. To verify that they are calibrated properly, the responsible party must conduct a test and make modifications to the control until it passes the test. The test results must be recorded on acceptance test forms and are part of the building documentation. These forms must be filled out before the enforcement agency grants a certificate of occupancy.

The Standards have acceptance test requirements for:

- Manual daylighting controls
- Automatic daylighting controls.
- Occupancy sensors.
- Automatic time-switch controls.

A detailed description of each acceptance test can be found in Chapter 10 of this manual, Acceptance Requirements and in the Reference Nonresidential Joint Appendix NA7.6.

## 7 Sign Lighting

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### 7.1 Overview

The Sign Lighting Standards conserve energy, reduce peak electric demand, and are technically feasible and cost effective. They set minimum control requirements, maximum allowable power levels and minimum efficacy requirements.

#### 7.1.1 History and Background

Regulations for lighting have been in effect in California since 1977, but until the adoption of the 2005 Standards only addressed indoor lighting, inside spaces that were air conditioned or heated, and outdoor lighting that was connected to a lighting panel when the lighting panel was located inside a conditioned building. The 2005 Standards expanded the scope to include most outdoor lighting applications, indoor and outdoor sign lighting applications, and indoor lighting applications in unconditioned buildings.

The 2008 Sign Lighting Standards evolved over a three year period through a dynamic, open, public process. The Energy Commission solicited ideas, proposals, and comments from a number of interested parties, and encouraged all interested persons to participate in a series of public hearings and workshops through which the Energy Commission gathered information and viewed presentations on energy efficiency possibilities from a variety of perspectives. The Energy Commission hired a consulting team that included a number of nationally recognized lighting experts to assist in the development of the Standards.

#### 7.1.2 Scope and Application

The 2008 Sign Lighting Standards address both indoor and outdoor signs. The Standards include control requirements for all illuminated signs (§133), as well as set limits on installed lighting power for internally illuminated and externally illuminated signs (§148).

#### 7.1.3 No Trade-offs

The Standards do not allow trade-offs between sign lighting power allowances and other end uses, such as outdoor lighting, indoor lighting, HVAC, building envelope, or water heating.

#### 7.1.4 Summary of Requirements

§119, §130, §133, §148 and §149
---------------------------------

##### **A. Mandatory Measures**

The Standards require that indoor and outdoor sign lighting be automatically controlled so that it is turned off during daytime hours and during other times when it is not needed. These controls must be certified by the manufacturer to the Energy Commission and listed in the Energy Commission directories. More detail on the mandatory measures is provided in Section 7.2.

In brief, the mandatory sign lighting requirements include:

- Automatic shutoff controls,
- Dimming controls, and
- Demand responsive controls for electronic message centers

All sign lighting controls must meet the requirements of §119 as applicable. The Sign Lighting Standards are the same throughout the state and are independent of outdoor Lighting Zones.

##### **B. Sign Lighting Power**

Sign Lighting Standards apply to both indoor and outdoor signs and contain two different prescriptive compliance options: Specific technology and watts per square foot approaches. The watt per square foot approach specifies a maximum lighting power that can be installed, expressed in W/ft<sup>2</sup> of sign area. The specific technology approach specifies that the signs shall be illuminated with efficient lighting sources (electronic ballasts, high efficacy lamps, efficient power supplies and efficient transformers). There are no performance compliance options available for sign lighting. Table 7-1 below summarizes the watts per square foot and specific technology sign compliance approaches. Detailed requirements are given in Section 7.3.

**C. Responsibility for Compliance**

The Standards include lighting control requirements for all illuminated signs (§133), and set limits on installed lighting power for internally illuminated and externally illuminated signs (§148).

The Mandatory Measures (sign lighting controls) are required for compliance with the Sign Lighting Standards. The same responsible person may install both the sign and the sign lighting controls, or separate responsible people may install the sign and the sign lighting controls.

A sign that complies with the installed lighting power requirements, but does not comply with the lighting control requirements does not comply with the Standards. The sign lighting controls must be installed for the sign to be in compliance with the Standards.

There are occasions when the sign installer is not licensed to install the sign lighting controls. For example, some sign installers have a C-45 license, which allows them to install the sign, but do not have a C-10 license to allow them to install the sign lighting controls. In such a case, it is the responsibility of the sign owner, general contractor, or architect to ensure that the sign complies with the lighting control requirements as well as the lighting power requirements.

If more than one person has responsibility for compliance, each responsible person shall separately prepare and sign a Certificate of Compliance, along with the imbedded Installation Certificate, applicable to the portion of construction for which they are responsible; alternatively, the person with chief responsibility for construction shall prepare and sign the Installation Certificate document(s) for the entire construction.



*Table 7-1 – Sign Compliance Alternatives*

<b>Watts Per Square Foot Approach</b> (See Section 7.3.1 for more information about the Watts Per Square Foot Approach)	
Type of Sign	Allowed Lighting Power
Internally Illuminated	12 W/ft <sup>2</sup>
Externally Illuminated	2.3 W/ft <sup>2</sup>
<b>Specific Technology Approach</b> (See Section 7.3.2 for more information about the Specific Technology Approach)	
<p>Signs illuminated by only the following light sources:</p> <ol style="list-style-type: none"> <li>1. High pressure sodium</li> <li>2. Pulse-start or ceramic metal halide with a ballast efficiency <math>\geq 88\%</math>, per ANSI C82.6-2005</li> <li>3. Pulse-start metal halide <math>\leq 320</math> watt, <math>\neq 250</math> or 175 watt, and with a ballast efficiency <math>\geq 80\%</math>, per ANSI C82.6-2005</li> <li>4. Neon and cold cathode with a transformer or power supply having: <ol style="list-style-type: none"> <li>a. Efficiency <math>\geq 75\%</math> with output current <math>&lt; 50</math> mA, or</li> <li>b. Efficiency <math>\geq 68\%</math> with output current <math>\geq 50</math> mA,</li> </ol> <p>where efficiency is defined as the ratio of output wattage to input wattage at 100% tubing load</p> </li> <li>5. Fluorescent lamps with a minimum color rendering index (CRI) of 80 (Note: signs using linear florescent lamps with electronic ballasts may use lamps with a CRI of less than 80)</li> <li>6. Light emitting diodes (LEDs) with a power supply efficiency <math>\geq 80\%</math> EXCEPT LEDs powered with 120 volt AC to lower voltage AC or DC power supplies rated <math>\leq 250</math> watt must comply with Appliance Efficiency Regulations (Title 20)</li> <li>7. Compact fluorescent lamps that do not contain medium based sockets. (E24/E26)</li> <li>8. Electronic ballasts <math>\geq 20</math> kHz</li> </ol>	

#### 7.1.5 Validating Compliance With A Label

One option that may be used for validating that a manufactured sign complies with the installed lighting power requirements is to have a permanent, pre-printed, factory-installed label. The label shall indicate if the sign is complying with the maximum allowed lighting power method of compliance, or with the Specific Lighting Source method of compliance.

The only labels that will be recognized for this purpose are labels listed with Underwriters Laboratory (UL) or other testing laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) or International Standards Organization (ISO) 17025 in accordance with ISO/IEC 17011 with the products produced under an ongoing inspection program carried out by a Type A inspection body in accordance with ISO/IEC 17020.

The use of such labels is not required.

The SLTG-1C (Certificate of Compliance, Sign Lighting) must always be filled out and signed whether a label is used or not.

The Installation Declaration Statement must always be signed, AFTER the sign has been installed, whether a label is used or not.

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## 7.2 Mandatory Measures

The mandatory features and devices must be included in all sign lighting projects when they are applicable. These features have been proven to be cost-effective over a wide range of sign lighting applications. The mandatory measures require that the performance of sign lighting controls be certified by the manufacturers to the Energy Commission, and that sign lighting systems have controls for efficient operation. Mandatory measures for signs are specified in §119, §130, and §133. These are similar to the mandatory measures for indoor and outdoor lighting.

### **Mandatory Measures Note Block**

If there are building plans, the person with overall responsibility must ensure that the Mandatory Measures that apply to the project are listed on the plans. The format of the list is left to the discretion of the Principal Designer.

### **Sample Notes Block – Sign Lighting Mandatory Measures**

#### **SIGN LIGHTING CONTROLS**

- ☐ **Controls for All Signs.** All signs with permanently connected lighting shall meet the requirements of Section 133.
- ☐ **Automatic Time Switch Control.** All signs with permanently connected lighting shall be controlled with an automatic time switch control that complies with the applicable requirements of Section 119.
- ☐ **Photocontrol or outdoor astronomical time switch control.** All outdoor signs shall be controlled with a photocontrol or outdoor astronomical time switch control unless exempted from the exceptions. See Section 133(a)2.
- ☐ **Dimming.** All outdoor signs shall be controlled with a dimmer that provides the ability to automatically reduce sign power by a minimum of 65 percent during nighttime hours unless exempted from the 5 possible exceptions. See Section 133(a)3.
- ☐ **Demand Responsive Electronic Message Center (EMC) Control,** newly connected lighting power load greater than 15 kW shall have a control installed that is capable of reducing the lighting power by a minimum of 30 % when receiving a demand response signal that is sent out by the local utility.

### 7.2.1 Certification of Sign Lighting Controls

#### §119

Manufacturers of lighting control products shall certify the performance of their products to the California Energy Commission in accordance with the applicable provisions in §119. It is the responsibility of the designer, however, to specify products that meet these requirements. Code enforcement officials, in turn, check that the sign lighting controls specified are indeed certified.

The certification requirement applies to photocontrols, astronomical time switches, and automatic controls. Lighting control devices may be individual devices or systems consisting of two or more components, such as an Energy Management Control System (EMCS), many of these requirements are part of standard practice in California and should be well understood by those responsible for designing or installing the sign lighting.

All automatic sign lighting control devices must be certified by the manufacturer with the Energy Commission before they can be installed. Once a device is certified, it is listed in the Directory of Automatic Lighting Control Devices. Call the Energy Hotline at 1-800-772-3300 to obtain more information.

All control devices must have instructions for installation and start-up calibration, must be installed in accordance with such directions, and must have a status signal that warns of failure or malfunction. See Section 5.2.1.2 of the Nonresidential Compliance Manual for more information about certifying lighting controls.

### 7.2.2 Automatic Sign Lighting Controls

#### §133(a)1 and §133(a) 2.

All signs, both indoor and outdoor, with permanently connected lighting shall be controlled with an automatic time switch control that complies with the applicable requirements of §119.

This means that an indoor sign must be controlled by at least an automatic time switch control. However, an astronomical time switch control may be used to comply with the automatic time switch control requirement for indoor signs because the astronomical time switch control exceeds the minimum required functionality of a simple automatic time switch control.

All outdoor signs shall be controlled with a photocontrol and/or a time switch control as follows:

Outdoor signs must be controlled by an automatic time switch control according to §133(a)1. Additionally, outdoor signs must be controlled by a photocontrol or outdoor astronomical time switch control according to §133(a)2. Therefore, an outdoor sign must be controlled by one of the following two options

1. An automatic time switch control in combination with a photocontrol, or
2. An outdoor astronomical time switch control.

Automatic time switch controls, photocontrols, and astronomical time switch controls used to meet these requirements must be certified by the manufacturer and listed in the Energy Commission directory.

Outdoor signs in tunnels and large covered areas that require illumination during daylight hours are not required to be controlled with a photocontrol or outdoor astronomical time switch control.

### 7.2.3 Dimming Controls

#### §133(a) 3.

All outdoor signs with permanently connected lighting must be controlled with a dimmer that provides the ability to automatically reduce sign power by a minimum of 65 percent during nighttime hours.

The dimming control requirements do not apply to:

1. Signs that are illuminated for less than one hour per day during daylight hours.
2. Outdoor signs in tunnels and large covered areas that require illumination during daylight hours.
3. Metal halide, high pressure sodium, cold cathode, and neon lamps used to illuminate signs or parts of signs.

Controls used to meet these requirements shall be certified by the manufacturer and listed in the Energy Commission directory.

### 7.2.4 Demand Responsive Electronic Message Center Controls

#### §133(a) 4.

All electronic message centers (EMCs) with a new connected lighting greater than 15 kW must have a control capable of reducing the lighting power by at least 30 percent upon receiving a demand response signal sent by the local utility.

The demand responsive controls do not apply to EMCs required by a health or life safety statute, ordinance, or regulation, including but not limited to exit signs and traffic signs. The requirements apply to all other types of signs.

**Example 7.2(a)****Question**

What are the mandatory sign lighting requirements for indoor signs?

**Answer**

The mandatory sign lighting requirements for indoor signs include:

1. An automatic time switch control that complies with the applicable requirements of §119.
2. Large indoor electronic message centers (EMC) (lighting power load > 15 kW) shall be capable of reducing lighting power  $\geq$  30 percent when receiving a demand response signal sent out by the local utility. However, EMCs required by a health or life safety statute, ordinance, or regulation are not required to be controlled by a demand response.

**Example 7.2(b)****Question**

What are the mandatory sign lighting requirements for outdoor signs?

**Answer**

1. The mandatory sign lighting requirements for outdoor signs include:
2. An automatic time switch control that complies with the applicable requirements of §119.
3. A photocontrol or outdoor astronomical time switch control.
4. All outdoor signs that are illuminated both day and night shall be controlled with a dimmer that provides the ability to automatically reduce sign power by a minimum of 65 percent during nighttime hours.
5. Large outdoor electronic message centers (EMC) (lighting power load > 15 kW) shall be capable of reducing lighting power  $\geq$  30 percent when receiving a demand response signal sent out by the local utility. However, EMCs required by a health or life safety statute, ordinance, or regulation are not required to be controlled by a demand response.

**Example 7.2(c)****Question**

Are there any situations when a photocontrol or outdoor astronomical time switch is not required for outdoor signs?

**Answer**

Yes, photocontrols or outdoor astronomical time switch controls are not required for outdoor signs in tunnels and large covered areas that require illumination during daylight hours.

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Example 7.2(d)**Question**

How do I determine if an outdoor sign is illuminated both day and night so as to require the ability to automatically reduce sign power by a minimum of 65 percent during nighttime hours?

**Answer**

All outdoor signs that are illuminated at night, and for one or more hours per day during daylight hours, shall be considered to be illuminated both day and night.

## Example 7.2(e)

**Question**

Are there situations when an outdoor sign that is illuminated both day and night is not required to be controlled with a dimmer that provides the ability to automatically reduce sign power by a minimum of 65 percent during night-time hours?

**Answer**

Yes, following are the two exceptions when an outdoor sign that is illuminated both day and night is not required to be controlled with a dimmer that provides the ability to automatically reduce sign power by a minimum of 65 percent during nighttime hours:

1. Outdoor signs in tunnels and large covered areas that require illumination during daylight hours.
2. Metal halide, high pressure sodium, cold cathode, and neon lamps used to illuminate signs or parts of signs.

## Example 7.2(f)

**Question**

What is the responsibility of the sign lighting designer with regard to using sign lighting controls that are certified to the Energy Commission and listed in the Energy Commission directories?

**Answer**

It is the responsibility of the manufacturer to certify the controls and to present the data to the Energy Commission so that it can be listed in the Energy Commission directories. It is the responsibility of the sign lighting designer to specify controls that have been certified and listed.

## Example 7.2(g)

**Question**

Because the Standards require sign lighting to be controlled by an automatic time switch control, will a sign on the inside of a mall be required to be turned off during the day?

**Answer**

No, the signs will not be required to be turned off during the day. The automatic time switch control will allow the owner/occupant to program their signs to be automatically turned on and off in accordance with their particular needs.

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### 7.3 Sign Lighting Energy Requirements

The Sign Lighting Standards apply to all internally illuminated (cabinet) signs, externally illuminated signs, unfiltered light emitting diodes (LEDs), and unfiltered neon, whether used indoors or outdoors. Examples are internally illuminated and externally illuminated signs, including billboards, and off-premise and on-premise signs.

§148 do not apply to unfiltered incandescent lamps that are not part of an electronic message center (EMC), internally illuminated sign, or an externally illuminated sign. In addition, §148 does not apply to traffic signs or exit signs. Exit signs and traffic signs must meet the requirements of the Appliance Efficiency Regulations (Title 20).

Even though the Standards take into consideration Outdoor Lighting Zones (OLZs) for outdoor lighting applications like parking lots, the Outdoor Sign Standards are the same throughout the state and are independent of Outdoor Lighting Zones.

§148 provide two alternative ways to comply with the Sign Lighting Standards. Both alternatives encourage the use of readily available, cost-effective lighting technology. The two alternatives are as follows:

1. **Alternative 1 - Watts Per Square Foot Approach.** This option sets the maximum power (watts) per ft<sup>2</sup> of sign. This approach allows sign makers maximum flexibility. It enables companies to introduce, develop and use any promising new lighting technology as long as it meets the power allowance. There are no constraints on the types of lighting equipment that a sign maker can use to comply under this approach, just as long the manufacturer does not exceed the maximum watts allowed for a sign of that size.

The maximum allowed lighting power is determined according to §148(a), and wattage must be determined according to the applicable provision of §130(d). §130(d) establishes how to determine lighting wattages depending upon the type of lighting technology used.

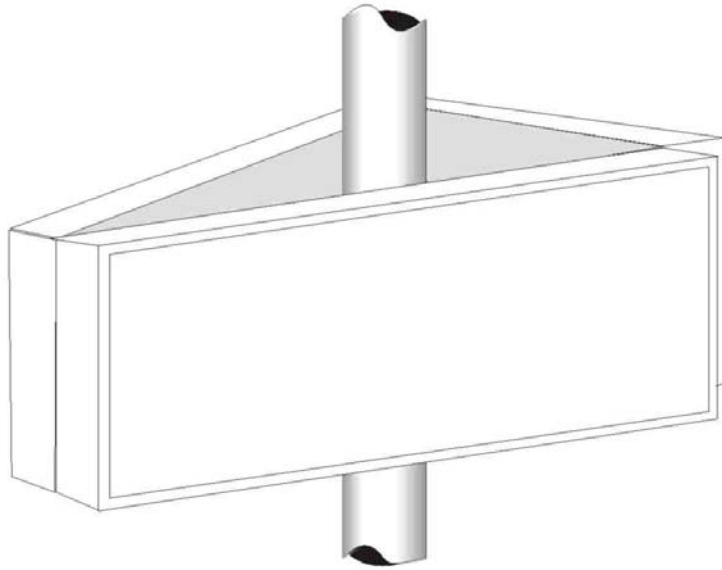
2. **Alternative 2 - Specific Technology Approach.** This option uses specific, energy-efficient lighting technologies. This option provides a simple specific technology approach for using these energy efficient technologies that are already being used by many in the sign industry.

The specific energy efficient lighting technologies are listed in §148(b).

#### 7.3.1 Watts Per Square Foot Approach

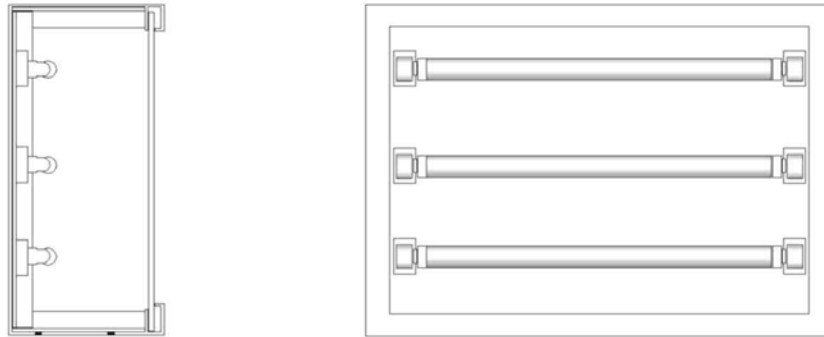
##### §148(a) 1.

The first alternative for internally illuminated signs (watts per square foot approach) sets a maximum power allowance of 12 W/ ft<sup>2</sup> times the area of the sign face. For double-faced signs, only the area of a single face can be used to determine the allowed lighting power. However, for deep sign cabinets where the lamps are isolated by an opaque divider so that they illuminate only one sign face, or for irregular shaped signs where the faces are not parallel and the lamps are shielded by an opaque divider so that they illuminate only one sign face, then the total area of all of the sign faces can be used to determine the allowed lighting power. See Figure 7-1, Figure 7-2, and Figure 7-3.



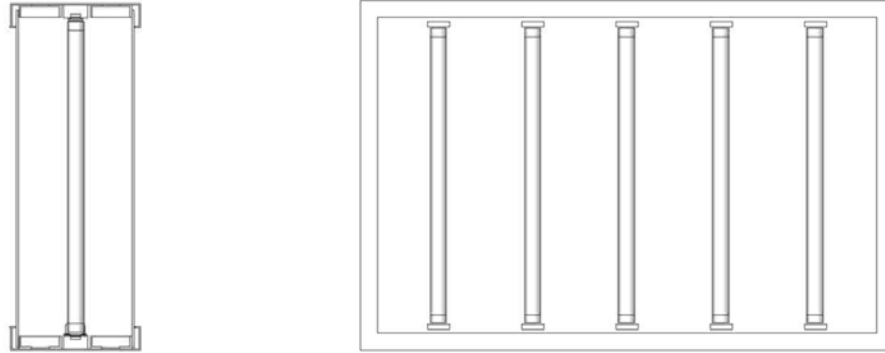
*Figure 7-1 – Multi-faced sign*

*Include Area from Each Face When Separated by Opaque Divider*



*Figure 7-2 – Single-faced Internally Illuminated Cabinet Sign with Fluorescent Lamp and Translucent Face*





*Figure 7-3 – Double-faced Internally Illuminated Cabinet Sign with Fluorescent Lamp and Translucent Faces*

For externally illuminated signs the maximum allowed lighting power is 2.3 W/ft<sup>2</sup> times the area that is illuminated without obstruction or interference. One or more fixtures must illuminate the sign area. See §148(a)2.

### **Sign Lighting Installed Wattage**

#### **§130(d and e)**

The installed lighting wattage in signs shall be determined in accordance with the applicable provisions of §130(d and e). Section 130(d and e) clarifies that wattage shall include the total lighting system, including wattage used by lamps, ballasts, transformers, and power supplies. The rules for determining lighting wattage are discussed in detail in Section 5.5, Calculating Lighting Power for Nonresidential Indoor Lighting.

### **7.3.2 Specific Technology Approach**

#### **§148(b)**

The second alternative (specific technology approach) requires that the sign be illuminated only with one or more of the following light sources, as applicable:

1. High pressure sodium.
2. Pulse start or ceramic metal halide lamps served by a ballast that has a minimum efficiency of 88 percent.
3. Pulse start metal halide lamps that are 320 watts or smaller, are not 250 W or 175 W lamps, and are served by a ballast that has a minimum efficiency of 80 percent.

For pulse start and ceramic metal lamps, the Standards define ballast efficiency as the measured output wattage to the lamp divided by the measured operating input wattage when tested according to ANSI C82.6-2005.

4. Neon or cold cathode lamps with transformer or power supply efficiency greater than or equal to following:
  - a) A minimum efficiency of 75 percent when the transformer or power supply rated output current is less than 50 mA, or
  - b) A minimum efficiency of 68 percent when the transformer or power supply rated output current is 50 mA or greater.

For neon and cold cathode lamps, the Standards define power supply efficiency as the ratio of the output wattage to the input wattage is at 100 percent tubing load.

5. Fluorescent lamps with a minimum color rendering index (CRI) of 80.
6. Light emitting diodes (LEDs) with a power supply having an efficiency of 80 percent or greater.

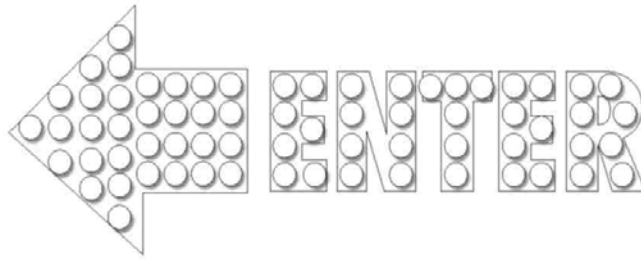
For single voltage external power supplies that are designed to convert 120 volt AC input into lower voltage DC or AC output, and which have a nameplate output power less than or equal to 250 W, comply with the applicable requirements of the Appliance Efficiency Regulations (Title 20). See *Exception* to §148(b)5.

7. Compact fluorescent lamps that do not contain a medium base socket (E24/E26).
  8. Electronic ballasts with a fundamental output frequency not less than 20 kHz
- No other light sources can be used on a sign complying under this option.

An example of a non-compliant sign using multiple lighting technologies in a single sign, would be a sign using both electronic ballasts for linear fluorescent lamps and probe start metal halide lamps. Even though the electronic ballasts comply, probe start metal halide lamps are not included as one of the approved specific lighting sources. Therefore, a sign using any lighting technologies other than those listed below cannot use this method of compliance. Instead, they must use the maximum allowed lighting power method of compliance on Page 3 of 4.

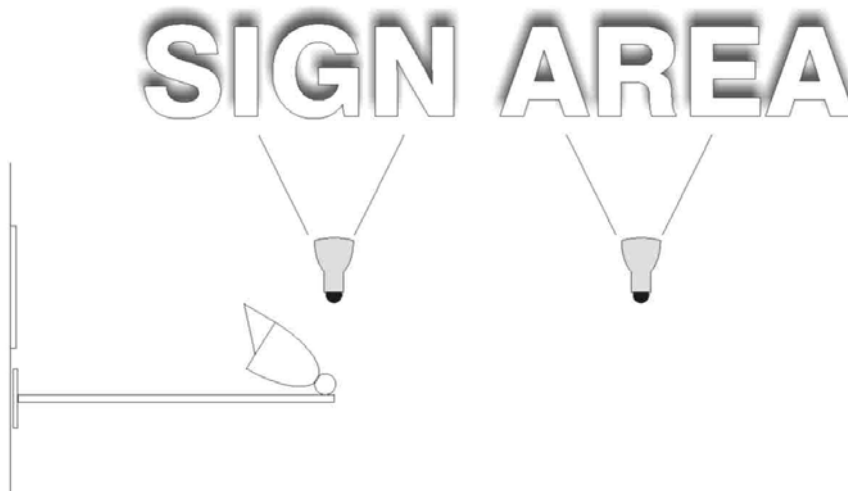
### Hybrid Signs

A sign may consist of multiple components, where some components are regulated, and some components are not regulated. For example, a single sign structure may have a regulated internally illuminated cabinet, plus regulated externally illuminated letters which are attached to a brick pedestal, plus unregulated unfiltered incandescent “chaser” lamps forming an illuminated arrow. For example, Figure 7-4 shows an arrow which is not part of an electronic message center (EMC) using incandescent lamps. If the lamps are not covered by a lens, then only the control regulations (§133) apply to the sign. This type of unfiltered incandescent sign is not regulated by §148.



*Figure 7-4 – Unfiltered Sign*

Figure 7-5 shows an externally illuminated sign using flood lighting, which is regulated by the Standards. The power (wattage) used for these lighting components must comply with the watts per square foot approach, or use only lighting technologies approved according to §148(b).



*Figure 7-5 – Externally Illuminated Sign Using Flood Lighting*

**Example 7.3(a)****Question**

Can I use neon or cold cathode lights in my sign and comply with the Standards under Alternative 2 (Specific Technology Approach)?

**Answer**

Yes, neon and cold cathode lights are allowed under the specific technology approach, provided that the transformers or power supplies have an efficiency of 75 percent or greater for output currents less than 50 mA and 68 percent or greater for output currents 50 mA or greater.

**Example 7.3(b)****Question**

Do signs inside a theater lobby or other indoor environments need to comply with the sign requirements?

**Answer**

Yes, all internally and externally illuminated signs whether indoor or outdoor must comply with either the specific technology or watts per square foot approach.

**Example 7.3(c)****Question**

My sign is equipped with both hardwired compact fluorescent lamps and incandescent lamps. Can my sign comply under the specific technology approach?

**Answer**

No. Since your sign is not exclusively equipped with energy efficient technologies allowed under the specific technology approach (incandescent sources are not allowed), it therefore must comply under the watts per square foot approach. Your other option is to replace the incandescent sources with an energy efficient option that is permitted under the specific technology approach, such as LED, pulse start or ceramic metal halide, or hard-wired CFL sources.

## Example 7.3(d)

**Question**

My sign has three parts, an internally illuminated panel sign equipped with electronic ballasts, and two unfiltered 30 mA neon signs on top and bottom of the panel sign displaying an illuminated arrow equipped with power supplies with an efficiency of 76 percent. Do this sign comply with the specific technology approach?

**Answer**

Yes, this sign is essentially made up of three different signs; an internally illuminated panel sign equipped with electronic ballast that complies with the specific technology approach and two unfiltered neon signs with efficient power supplies also that comply with the specific technology approach. Therefore the entire sign complies with the Standards.

## Example 7.3(e)

**Question**

Are signs required to comply with Outdoor Lighting Zone requirements?

**Answer**

No. Outdoor Lighting Zones do not apply in any way to signs. The Sign Lighting Standards are the same throughout the state; they do not vary with Outdoor Lighting Zones.

### 7.3.3 Additions and Alterations

#### §149(a) 1. §149(b)1H

All new signs, regardless of whether they are installed in conjunction with an indoor or outdoor addition or alteration to a building or outdoor lighting system, must meet the requirements for newly installed equipment, as required by §119, §130, §133 and §148.

### 7.3.4 Sign Alterations

#### §149(b)1 K

Existing indoor and outdoor internally illuminated and externally illuminated signs that are altered as specified by §149(b)1K are required to meet the requirements of §148. Altered components of existing indoor and outdoor internally and externally illuminated signs must also meet the requirements of §130(d)2, if Watts per square foot Approach is used for compliance.

The lighting power requirements (either specific technology or watts per square foot) are triggered by alterations to existing internally or externally illuminated signs when any of the following occurs as result of the alteration as specified in §149(b)1:

- The connected lighting power is increased.
- More than 50 percent of the ballasts are replaced and rewired.
- The sign is relocated to a different location on the same site or on a different site.

The lighting power requirements are not triggered when just the lamps are replaced, the sign face is replaced or the ballasts are replaced (without rewiring).

These signs must comply with either alternative (a) or alternative (b) of §148. Sign ballast rewiring that triggers the alterations requirements generally involves rewiring from parallel to series or visa versa, or when a ballast(s) is relocated within the same sign requiring relocating the wires. This does not include routine in-place ballast replacements.

**Example 7.3(f)****Question**

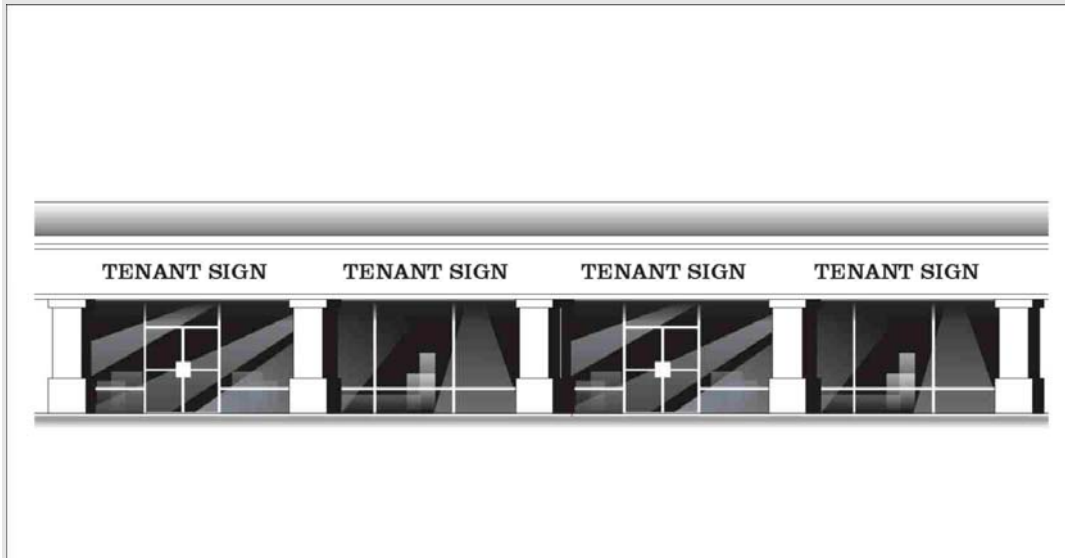
We are replacing 60 percent of the ballasts in a sign. Must we replace the remaining ballasts in the sign in order to comply with the Standards?

**Answer**

It depends. If more than 50 percent of the ballasts are being replaced, and the replacement involves rewiring the ballasts, then the alteration requirements apply to the whole sign. If more than 50 percent of the ballasts are being replaced during regular maintenance, and the ballasts are not being rewired, then the sign is not required to meet the Standards requirements. However, when existing wiring will allow the direct replacement of a magnetic ballast with a high efficiency high frequency electronic fluorescent ballast, even though Standards do not require the electronic ballast, the sign owner is encouraged to replace the magnetic ballasts with an electronic ballast.

**Example 7.3(g)****Question**

I have a strip mall full of signs. Must I immediately bring all of these signs into compliance even if I'm not going to alter them?

**Answer**

No, only those signs in which at least 50 percent of the ballasts are replaced and rewired, or those signs that are moved to a new location (on the same property or different property) must comply with either Alternative 1 or 2 of §148. Also, all newly installed signs must also comply with either Alternative 1 or 2.

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## **7.4 Sign Lighting Plan Check Documents**

At the time a building permit application is submitted to the enforcement agency, the applicant also submits plans and energy compliance documentation. This section describes the required forms and procedures for documenting compliance with the sign lighting requirements of the Standards. It does not describe the details of the requirements; these are presented in Section 7.1.4, Summary of Requirements. The following text is addressed to the designer preparing construction and compliance documents, and to the enforcement agency plan checkers who are examining those documents for compliance with the Standards.

For the 2005 Standards, the sign lighting compliance forms were located with a set of outdoor lighting compliance forms (OLTG). However, for the 2008 Standards, the sign lighting compliance forms are stand-alone forms (SLTG). The use of each part of the sign lighting compliance form is described below, and complete instructions for each part is presented in the following subsection.

### **7.4.1 SLTG-1C: Certificate of Compliance (Sign Lighting)**

The SLTG-1C Certificate of Compliance form consists of five parts. A copy of these forms must be submitted to the enforcement agency at the time of building permit application. With enforcement agency approval, the applicant may use alternative formats of these forms (rather than the official Energy Commission forms), provided the information is the same and in a similar format.

The SLTG-1C set of compliance forms has the following five parts:

Part 1 - Certificate of Compliance Declaration Statement

Part 2 - Installation Certificate

Part 3 - Mandatory Sign Lighting Controls, including declarations as to who has responsibility for installing the signs, and who has responsibility for installing the sign lighting controls

Part 4 - Maximum Allowed Lighting Power Method of Compliance and Field Inspection Energy Checklists

Part 5 - Specific Lighting Source Method of Compliance and Field Inspection Energy Checklists



**SLTG-1C    Page 1 of 4*****Project Description***

- PROJECT NAME is the title of the project, as shown on the plans and as known to the enforcement agency.
- DATE is the date of preparation of the compliance submittal package. It shall be on or after the date on the plans, and on or before the date on the building permit application.
- PROJECT ADDRESS is the address of the project as shown on the plans and as known to the enforcement agency.
- LOCATION OF SIGN shall be either Outdoor Sign or Indoor Sign.
- PHASE OF SIGN CONSTRUCTION indicates the status of the project described in the compliance documents. Check all that are appropriate:
  - ✓NEW SIGN shall be checked for newly installed signs.
  - ✓SIGN ALTERATION shall be checked for an alteration to an existing sign. (Note: Replacement of parts of an existing sign, including replacing lamps, the sign face, or ballasts that do not require rewiring, is not an alteration that is subject to the requirements of the Standards. However, when a sign is relocated, it is subject to the requirements of the Standards.)
- TYPE OF LIGHTING CONTROL indicates the status of the sign lighting controls described in the compliance documents. Check all that are appropriate:
  - ✓NEW LIGHTING CONTROLS shall be checked when installing new sign lighting controls where there had not been existing sign lighting controls.
  - ✓REPLACED LIGHTING CONTROLS shall be checked when replacing existing sign lighting controls with compliant sign lighting controls.
  - ✓NOT INSTALLING LIGHTING CONTROLS shall be checked when someone else is responsible to install the sign lighting controls, or when existing sign lighting controls are already compliant with the Standards.
- This Certificate of Compliance includes the following components (check all that apply):
  - ✓MANDATORY MEASURES (Sign Lighting Controls). Check this box if the person signing this Certificate of Compliance is responsible for installing compliant sign lighting controls. Page 2 of 4, parts 3(a) and (b), shall be filled out if this box is checked. Page 2 of 4, part 3(a) shall be filled out if this box is not checked.
  - ✓MAXIMUM ALLOWED LIGHTING POWER. Check this box if compliance for any signs in this Certificate of Compliance is achieved by the maximum allowed lighting power per square feet of sign compliance option. Page 3 of 4, Part 4 shall be filled out if this box is checked.
  - ✓SPECIFIC LIGHTING SOURCES. Check this box if compliance for any signs in this Certificate of Compliance is achieved using the Specific Lighting Source compliance option. Page 4 of 4, Part 5 shall be filled out if this box is checked.

**SLTG-1C    Part 1            Certificate of Compliance Declaration Statement**

The Certificate of Compliance Declaration Statement is signed by the person responsible for the energy compliance documentation. The compliance documentation must be consistent with the plans. The person signing the Certificate of Compliance may be a C10, C45, or other person eligible under Division 3 of the California Business and Professions Code to accept responsibility for the sign compliance. The license number may be that of the contractor or other person eligible under Division 3. This person's telephone number is required to facilitate response to any questions that arise.

**SLTG-1C    Part 2            Installation Certificate**

- Permit number and Checked by/Date are to be filled in only by the Enforcement Agency.

The Installation Declaration Statement may NOT be signed until after the components included in this Certificate of Compliance have been installed. This declaration statement is signed by the person responsible for installing the sign and/or sign lighting controls, consistent with the information listed in this Certificate of Compliance. If the installed sign or sign lighting controls are different than the information in this Certificate of Compliance, then a corrected Certificate of Compliance must be submitted. The person signing this may be a C10, C45, or other person eligible under Division 3 of the California Business and Professions Code to accept responsibility for the sign compliance. The license number may be that of the contractor or other person eligible under Division 3. This person's telephone number is required to facilitate response to any questions that arise.

The Business and Professions Code governs who is qualified to sign these declaration statements. See Chapter 2 of the *2008 Nonresidential Compliance Manual* for additional information.

**SLTG-1C    Page 2 of 4****SLTG-1C    Part 3            Mandatory Sign Lighting Controls**

- PROJECT NAME and DATE are the same as those at the top of Page 1 of 4 of this Certificate of Compliance.

**Part 3(a)                    Statements of Responsibility**

The person signing the Certificate of Compliance Declaration Statement shall check Yes or No for all of the statements in Part 3(a), whether they are responsible for only the sign, only the sign lighting controls, or both. Yes or No must be checked for each of the following statements:

1. I have responsibility for installing the sign lighting controls.  
✓If Yes is checked here, complete both Parts 3(a) and 3(b) of this form.  
✓If No is checked here, complete only Part 3(a) of this form.
2. There are no existing sign lighting controls and I will be installing compliant sign lighting controls. A 'Yes' answer indicates that the person filling out this Certificate of Compliance is responsible for one of the following:
  - a) Only the sign lighting controls, or
  - b) Both the sign lighting controls and the sign lighting power requirements.
3. There are no existing sign lighting controls and someone else will be responsible to install compliant sign lighting controls. A 'Yes' answer indicates that the person filling out this Certificate of Compliance is responsible for only the sign lighting power requirements, and someone else will be responsible for the sign lighting controls.
4. There are existing sign lighting controls that do not comply with the applicable provision of §119 and §133 and I will be installing compliant sign lighting controls. A 'Yes' answer indicates that the person filling out this Certificate of Compliance is responsible for one of the following:
  - a) Only the sign lighting controls, or
  - b) Both the sign lighting controls and the sign lighting power requirements.
5. There are existing sign lighting controls that do not comply with the applicable provision of §119 and §133 and someone else will be responsible to install compliant sign lighting controls. A 'Yes' answer indicates that the person filling out this Certificate of Compliance is responsible for only the sign lighting power requirements, and someone else will be responsible for the sign lighting controls.

**Part 3(b)****Mandatory Sign Lighting Controls**

The person responsible for complying with the sign lighting control requirements must answer all of the questions in this section. If the person signing this Certificate of Compliance is not responsible for the sign lighting controls, then this section is not required to be filled out.

- If there are construction documents, indicate where on the building plans the mandatory measures (sign lighting controls) note block can be located. This will help the plan checker locate the compliant controls on the plans.

The provided check boxes shall be completed as applicable to the project. Each row represents one of the mandatory controls requirements for signs. Check Yes (Y), No (N), or Not Applicable (NA) as appropriate for each of the rows below.

**1. §133(a)1 for indoor signs:**

- ✓'Y' indicates the person responsible for complying with the sign lighting control requirements shall install an automatic time switch control meeting the minimum requirements in Section 119(c) of the Standards.
- ✓'N' indicates the sign lighting controls do not comply with the Standards, therefore the sign is not in compliance with the Standards.
- ✓Check 'NA' only if the sign is an outdoor sign that is addressed in question number 2.

**2. §133(a)(1 and 2) for outdoor signs:**

- ✓'Y' indicates the person responsible for complying with the sign lighting controls requirements shall install one of the following control systems:
  - a) Both of the following controls: Automatic time switch control meeting the minimum requirements in Section 119(c) in addition to a photo control, or
  - b) Outdoor astronomical time switch meeting the minimum requirements in Section 119(i).
- ✓'N' indicates one of the following:
  - a) The sign lighting controls do not comply with the Standards, therefore, the sign is not in compliance with the Standards, or
  - b) Exception to 133(a)2 (below) has been checked 'Y'.
- ✓Check 'NA' only if the sign is an indoor sign addressed in question number 1

**Exception to §133(a)2:**

- ✓'Y' indicates the outdoor signs are in tunnels or large covered areas that require illumination during daylight hours, therefore the sign is not required to have the sign lighting controls required in Section 133(a)2.
- ✓'NA' indicates this exception is not applicable to the sign.

**3. §133(a)3 for outdoor signs:**

- ✓'Y' indicates the person responsible for complying with the sign lighting controls requirements shall install a dimmer that provides the ability to automatically reduce sign power by a minimum of 65 percent during nighttime hours.

✓‘ N’ indicates one of the following:

- a) The sign lighting controls do not comply with the Standards, therefore the sign is not in compliance with the Standards, or
- b) One or more of the three Exceptions to §133(a)3, below, have been checked ‘Y’.

✓Check ‘NA’ only if the sign is an indoor sign addressed in question number 1.

**Exception 1 to §133(a)3:**

✓‘Y’ indicates the outdoor sign lighting is ON only at night.

✓ ‘NA’ indicates this exception is not applicable to the sign.

**Exception 2 to §133(a)3:**

✓‘Y’ indicates the outdoor signs are in tunnels or large covered areas that require illumination during daylight hours.

✓‘NA’ indicates this exception is not applicable to the sign.

**Exception 3 to §133(a)3:**

✓‘Y’ indicates that only metal halide, high pressure sodium, cold cathode, or neon lamps are used to illuminate the sign or parts of the sign.

✓‘NA’ indicates this exception is not applicable to the sign.

**4. §133(a)4          Electronic Message Center**

✓‘Y’ indicates the sign is an Electronic Message Center (EMC) having a new connected lighting power load greater than 15 kW and the person responsible for complying with the sign lighting controls requirements shall install a control that is capable of reducing the lighting power by a minimum of 30 percent when receiving a demand response signal.

✓‘N’ indicates either the sign lighting controls do not comply with the Standards, or that the Exception to §133(a)4 below has been checked ‘Y’.

✓Check ‘NA’ only if the sign is not an EMC

**Exception to §133(a)4**

✓‘Y’ indicates the sign is an EMC required by a health or life safety statute, ordinance, or regulation, including but not limited to exit signs and traffic signs.

✓‘NA’ indicates this exception is not applicable to the sign.

The box on the bottom of this page, “Field Inspector Notes,” is for use by the building inspector.

**SLTG-1C Page 3 of 4****SLTG-1C Part 4 Maximum Allowed Lighting Power Method of Compliance**

There are two methods available for sign lighting compliance. One option is to install no more than the maximum allowed lighting power. The other option is to use only specific lightings sources.

Complete Page 3 of 4 if compliance is achieved using the maximum allowed lighting power per square foot of sign method of compliance. Do not fill out this page if there are signs using only the Specific Lighting Source method of compliance. Instead, complete part 5 (Page 4 of 4) of this Certificate of Compliance if there are signs using the Specific Lighting Source method of compliance.

This page serves two functions:

1. To document and certify when compliance is achieved using the maximum allowed lighting power per square foot of sign method of compliance, and
2. To be used by the enforcement agency as a field inspection energy checklist for sign lighting.

How to fill out this page:

- PROJECT NAME and DATE are the same as those at the top of Page 1 of 4 of this Certificate of Compliance.

Use a separate row for each sign.

- A. Enter the symbol or code used on the plans (when plans are required) and other documents.
- B. Enter a narrative description of the sign or the location of the sign on the building, and indicate the location of the sign on construction documents.
- C. OPTIONAL - Check this box only if this sign has a permanent, pre-printed, factory-installed label, listed with Underwriters Laboratory (UL) or other testing laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) or International Standards Organization (ISO) 17025 in accordance with ISO/IEC 17011 with the products produced under an ongoing inspection program carried out by a Type A inspection body in accordance with ISO/IEC 17020, confirming that the sign complies with Section 148 of the California 2008 Title 24, Part 6 Standards, using the maximum allowed lighting power method of compliance.

For signs with such a label, columns 'D' through 'H' are not required to be filled out.

Note: Using a label is an optional method to validate compliance. The use of such a label is not required for compliance.

The SLTG-1C (Certificate of Compliance, Sign Lighting) must always be filled out and signed whether a label is used or not.

The Installation Declaration Statement must always be signed, AFTER the sign has been installed, whether a label is used or not.

- D. Enter the sign area in square feet.

- E. Enter “I” if the sign is internally illuminated or “E” if the sign is externally illuminated.
- F. Enter the allowed watts per square foot. Enter 12 if the sign is listed as “I” in column E. Enter 2.3 if the sign is listed as “E” in column E.
- G. Enter the maximum allowed lighting power. Multiply the square footage in column D by the allowed Lighting Power Density (LPD = watts) in column F.
- H. Enter the total actual installed watts used for the sign, as determined according to the applicable provision of §130(d or e).
- I. Enter Y if the wattage entered in column H is less than or equal to the wattage entered in column G. Otherwise, the sign does not comply.
- J. This page doubles as a field inspection checklist. This column is reserved for the building inspector.

**SLTG-1C      Page 4 of 4****SLTG-1C      Part 5              Specific Lighting Source Method of Compliance**

There are two methods available for sign lighting compliance. One option is to install no more than the maximum allowed lighting power. The other option is to use only specific lighting sources.

Complete Page 4 of 4 if compliance is achieved using the Specific Lighting Source method of compliance. Do not fill out this page if there are signs only using the allowed lighting power per square foot of sign method of compliance. Instead, complete Part 4 (page 3 of 4) of this Certificate of Compliance if there are signs using the allowed lighting power method of compliance.

This page two serves two functions:

1. To document and certify when compliance is achieved using the Specific Lighting Source method of compliance, and
2. To be used by the enforcement agency as a field inspection energy checklist for sign lighting.

How to fill out this page:

- PROJECT NAME and DATE are the same as those at the top of Page 1 of 4 of this Certificate of Compliance.

Use a separate row for each sign.

- A. Enter the symbol or code used on the plans (when plans are required) and other documents.
- B. Enter a narrative description of the sign or the location of the sign on the building, and indicate the location of the sign on the construction documents.
- C. OPTIONAL - Check this box only if this sign has a permanent, pre-printed, factory-installed label, listed with Underwriters Laboratory (UL) or other testing laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) or International Standards Organization (ISO) 17025 in accordance with ISO/IEC 17011 with the products produced under an ongoing inspection program carried out by a Type A inspection body in accordance with ISO/IEC 17020, confirming that the sign complies with Section 148 of the California 2008 Title 24, Part 6 Standards, using the Specific Lighting Source method of compliance.

For signs with such a label, column 'D' is not required to be filled out.

Note: Using a label is an optional method to validate compliance. The use of such a label is not required for compliance.

The SLTG-1C (Certificate of Compliance, Sign Lighting) must always be filled out and signed whether a label is used or not. The Installation Declaration Statement must always be signed, AFTER the sign has been installed, whether a label is used or not.



- D. From the list below, enter numbers 1 through 10 as appropriate. The sign shall use only lighting technologies listed below to comply with the Specific Lighting Source method of compliance.
- 1 High pressure sodium lamps
  - 2 Pulse start or ceramic metal halide lamps served by a ballast with  $\geq 88\%$  efficiency
  - 3 Pulse start metal halide lamps that are  $\leq 320$  watts, are not 250 watt or 175 watt lamps, and are served by a ballast with  $\geq 80\%$  efficiency
  - 4 Neon or cold cathode lamps with transformer or power supply efficiency  $\geq 75\%$  with rated output current  $< 50$  mA
  - 5 Neon or cold cathode lamps with transformer or power supply efficiency  $\geq 68\%$  with rated output current  $\geq 50$  mA
  - 6 Fluorescent lamps with a color rendering index (CRI) of  $\leq 80$  (Note: when using electronic ballasts for compliance, lamps with a CRI  $< 80$  may be used)
  - 7 Light emitting diodes (LEDs) with a power supply with  $\geq 80\%$  efficiency
  - 8 Single voltage LED external power supplies designed to convert 120 volt AC input into lower voltage DC or AC output, having a nameplate output power less than or equal to 250 watts, and certified to the Energy Commission as complying with the applicable requirements of the Appliance Efficiency Regulations (Title 20).
  - 9 Compact fluorescent lamps that do not contain a medium screw base socket (E24/E26)
  - 10 Electronic ballasts with a fundamental output frequency  $\geq 20$  kHz
- E. This page doubles as a field inspection checklist. Column E is reserved for the building inspector.

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### **7.5 Lighting Inspection**

The electrical building inspection process for energy compliance is carried out along with the other building inspections performed by the enforcement agency. The inspector relies upon the plans and upon the SLTG-1C Certificate of Compliance form.

No Acceptance Test is required.

### 8.3.3 Condensers

§126(d)
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The most common refrigerants in use today are either single component or azeotrope refrigerants. An azeotrope is a blend of different components that together form a mixture with its own unique set of thermodynamic properties. A good example of an azeotrope would be a mixture of salt and water; both single component and azeotrope refrigerants boil and condense at the same temperature for a given pressure.

Other refrigerant types called zeotropes are blends of several components that do not combine and form a mixture. In this case the individual components retain their own thermodynamic properties. A good example of a zeotrope is a blend of oil and water. For zeotropic refrigerants at a given pressure, the saturated vapor temperature (dew point) is not the same as the saturated liquid temperature (bubble point). The difference in these two temperatures is called *temperature glide*. PT chart information published by manufacturers for blends with temperature glide greater than about 5 degrees F generally list both the bubble-point and the dew point pressure at a given temperature.

*Saturated Condensing Temperature (SCT)*. For single component and azeotrope refrigerants, SCT is the saturation temperature corresponding to the refrigerant pressure at the condenser entrance. For zeotropic refrigerants, the SCT is the arithmetic average of the dew point and bubble point temperatures corresponding to the refrigerant pressure at the condenser entrance.

All refrigeration systems using ammonia as the refrigerant must be evaporatively cooled. This requirement may be met by an evaporative condenser or by use of a water-cooled condenser connected to a closed loop fluid cooler or cooling tower. Air cooled condensers and groundwater condensers are not permitted in ammonia systems. The condensers (whether evaporative condensers or water-cooled condenser plus cooling tower/fluid cooler) must be sized to provide sufficient heat rejection capacity under design conditions while maintaining a specified maximum “approach” temperature that varies by climate. When determining design heat rejection rates, reserve or backup compressors are not included in the total heat rejection calculations. The approach temperature is defined as the difference between the saturated condensing temperature and the outdoor wet-bulb temperature. Designers should use the 0.5 percent design wet-bulb temperature from Table 2-3 – Design Day Data for California Cities in the Reference Joint Appendices JA2 to demonstrate compliance with this requirement. The approach temperature requirements are listed in Table 8-2.

Table 8-2 Condenser fans for evaporative condensers must be continuously variable speed. Variable frequency drives are commonly used to provide continuously variable speed control of condenser fans. The condensing temperature control system must be designed to control all fans serving a common condenser loop in unison. Thus, the fan speed of all fans within a single condenser or set of condensers serving a common high side or cooling water loop should modulate together, rather than running some fans at full flow while controlling the condensing temperature by varying the speed of a single fan. Once the fan speed has been reduced to a minimum level, fans may be shut down while modulating the speed of the remaining fans to maintain the condensing temperature set point.

The minimum saturated condensing temperature set point for systems utilizing evaporative condensers must be 70°F (21°C) or less. To provide stable system operation at the minimum condensing temperature, all components in the system must be capable of operating at a saturated condensing temperature less than or equal to the minimum saturated condensing temperature set point.

To minimize overall system energy consumption, the condensing temperature set point in evaporatively cooled systems must be reset using outdoor wet bulb temperature (i.e. variable set point control) rather than controlling to a single set point.

Alternative set point control strategies may be utilized which achieve similar results to the prescribed wet bulb following control method; controlling fan speed by utilizing calculations or mapped performance to minimizing total compressor and condenser fan power. These controls are uncommon but may be used if the control method is sufficiently described and proven to the satisfaction of the local enforcement agency.

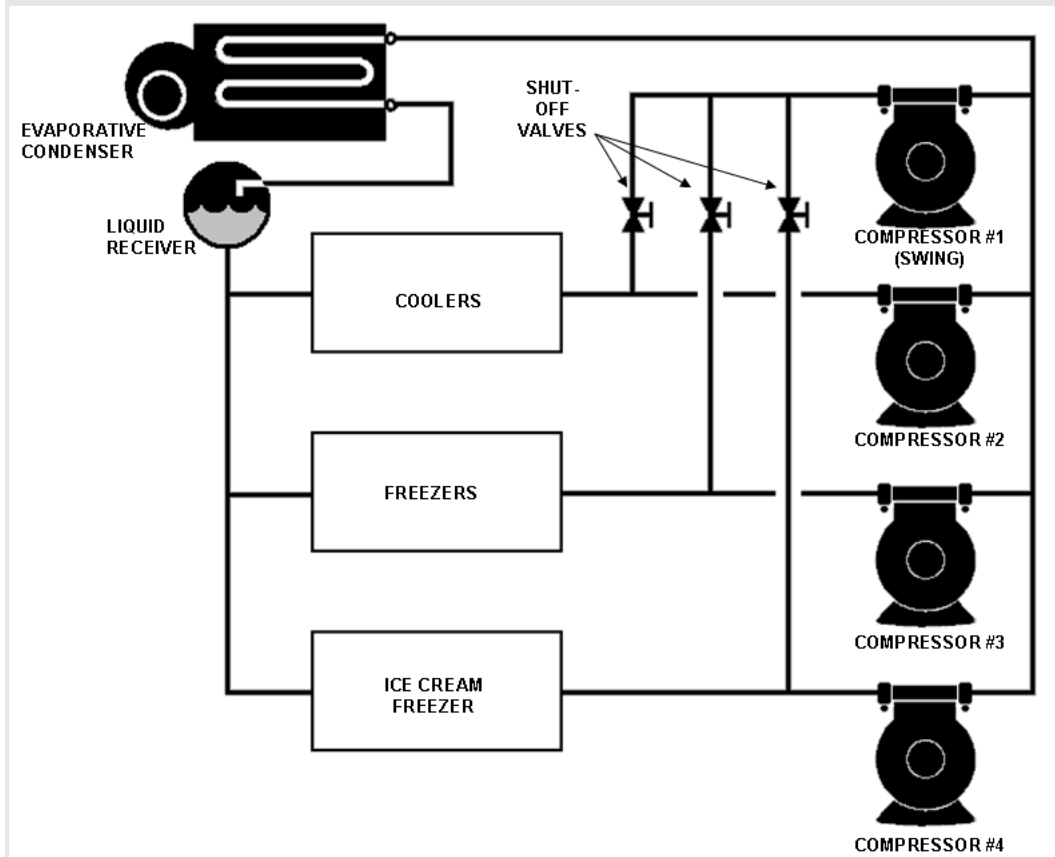
Table 8-2 – Approach Temperature Requirements for Evaporative Condensers

0.5% Design wet-bulb temperature from Table 2-3	Maximum Approach Temperature
$\leq 76^{\circ}\text{F}$ ( $24^{\circ}\text{C}$ )	$20^{\circ}\text{F}$ ( $11^{\circ}\text{C}$ )
Between $76^{\circ}\text{F}$ ( $24^{\circ}\text{C}$ ) and $78^{\circ}\text{F}$ ( $26^{\circ}\text{C}$ )	$19^{\circ}\text{F}$ ( $10.5^{\circ}\text{C}$ )
$\geq 78^{\circ}\text{F}$ ( $26^{\circ}\text{C}$ )	$18^{\circ}\text{F}$ ( $10^{\circ}\text{C}$ )

## Example 8-9

**Question**

The refrigerated warehouse compressor plant shown below has a backup or “swing” compressor. Does the heat rejection from this compressor need to be included in the condenser sizing calculations?

**Answer**

No. The heat rejection calculations for purposes of this Standards exclude compressor(s) that are used solely for backup. In this case, the calculations would include the heat of rejection from Compressors 2, 3, and 4 and would exclude Compressor 1.

## Example 8-10

**Question**

A system is to be designed with an evaporative condenser in a location where the 0.5 percent design wet bulb temperature is  $72^{\circ}\text{F}$  ( $22^{\circ}\text{C}$ ). What is the maximum design approach?

*Table 10-1 – Acceptance Forms*

<b>Component</b>	<b>Form Name</b>	<b>Standards Reference</b>	<b>Reference Nonresidential Appendix NA7</b>
Envelope	ENV-2A – Fenestration Acceptance	§10-111 & §116	NA7.4.1
Mechanical	MECH-2A – Ventilation Systems - Variable Air and Constant Volume Systems	§10-103(b)4 & §121(b)2 & §125(a)1	NA7.5.1.1 NA7.5.1.2
	MECH-3A – Constant-Volume, Single-Zone, Unitary A/C and Heat Pumps	§121(c)2 & §122 & §125(a)2	NA7.5.2
	MECH-4A – Air Distribution Systems	§125(a)3 & §144(k)	NA7.5.3
	MECH-5A – Air Economizer Controls	§125(a)4 & §144(e)	NA7.5.4
	MECH-6A – Demand Control Ventilation (DVC)	§121(c)4 & §121(c)4E & §125(a)5	NA7.5.5
	MECH-7A – Supply Fan Variable Flow Controls (VFC)	§125(a)6 & §144(c)2C & §144(c)2D	NA7.5.6
	MECH-8A – Valve Leakage Test	§125(a)8 & §125(a)9 & §144(j)1 & §144(j)5 & §144(j)6	NA7.5.7
	MECH-9A – Supply Water Temperature Reset	§125(a)8 & §144(j)4	NA7.5.8
	MECH-10A – Hydronic System Variable Flow Control	§125(a)7 & §144(j) & §144(j)1 & §144(j)5 & §144(j)6	NA7.5.9
	MECH-11A – Automatic Demand Shed Control Acceptance	§122(h) & §125(a)10	NA7.5.10
	MECH-12A – Fault Detection & Diagnostics for DX Units	§125(a)11	NA7.5.11
	MECH-13A – Automatic Fault Detection & Diagnostics for Air Handling & Zone Terminal Units	§125(a)12	NA7.5.12
	MECH-14A – Distributed Energy Storage DX AC Systems Test	§125(a)13	NA7.5.13
	MECH-15A – Thermal Energy Storage (TES) Systems	§125(a)14	NA7.5.14
Indoor Lighting	LTG-2A – Lighting Controls LTG-3A – Daylighting Controls	§119(d) & §119(e) & §131(d)	NA7.6.1, 7.6.2, 7.6.3 and 7.6.4
Outdoor Lighting	OLTG-2A – Automatic Daylighting Controls and Outdoor Motion Acceptance Test	§119(d),(f) and §132(a and c)	NA7.6.1, NA7.7.1 and 7.7.2

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## **10.5 Envelope & Mechanical Acceptance Testing Overview**

### 10.5.1 Administrative Regulations

§10-103(b)

The administrative requirements contained in the Standards require the envelope and mechanical plans and specifications to contain:

- New for 2008 is Envelope Acceptance Form, ENV-2A, requirements for Fenestration; verify label certificate including thermal performance matches building plans and energy compliance.
- New for 2008 are Mechanical Acceptance Forms, MECH-10A through MECH-15A, additional new mechanical acceptance procedures as indicated below in detail.
- Completed acceptance testing forms for mechanical systems and equipment shown in Table 10-1, record drawings are provided to the building owners within 90 days of receiving a final occupancy permit,
- Operating and maintenance information are provided to the building owner, and
- Installation certificates for mechanical equipment (for example factory installed economizers)

### 10.5.2 Field Process

The construction inspection is the first step in performing the acceptance tests. In general, this inspection should identify:

- Fenestration product, HVAC Equipment, and controls are properly specified, properly located, identified, correctly installed, calibrated and set points and schedules established.
- Documentation is available to identify settings and programs for each device, and
- For some air distribution systems (as identified in §116(a) and §144(k)), this may include select tests to verify acceptable leakage rates while access is available.

Functional and Verification Testing is to be performed on the following devices:

#### ***Envelope***

- ENV-1A – Will no longer be used. Required information has been transferred to ENV-2A.

## Appendix A

### Compliance Forms and Worksheets

Certificate of Compliance					
Envelope	Mechanical	Lighting	Outdoor Lighting	Sign Lighting	Refrigerated Warehouse
<b>ENV-1C</b> Certificate of Compliance and Field Inspection Checklist	<b>MECH-1C</b> Certificate of Compliance and Field Inspection Checklist	<b>LTG-1C</b> Certificate of Compliance and Field Inspection Checklist	<b>OLTG-1C</b> Certificate of Compliance and Field Inspection Checklist	<b>SLTG-1C</b> Certificate of Compliance (Sign Lighting)	<b>RWH-1C</b> Certificate of Compliance
<b>ENV-2C</b> Envelope Component Approach	<b>MECH-2C</b> Air, Water Side System, Service Hot Water & Pool Requirements	<b>LTG-2C</b> Lighting Controls Credit Worksheet	<b>OLTG-2C</b> Outdoor Lighting Worksheet	-----	-----
<b>ENV-3C</b> Overall Envelope TDV Energy Approach	<b>MECH-3C</b> Mechanical Ventilation and Reheat	<b>LTG-3C</b> Indoor Lighting Power Allowance	-----	-----	-----
<b>ENV-4C</b> Skylight Area Support Worksheet	<b>MECH-4C</b> Fan Power Consumption	<b>LTG-4C</b> Tailored Method Worksheet	-----	-----	-----
<b>FC-1</b> CEC Default U-factor and SHGC Label Certificate	-----	<b>LTG-5C</b> Line Voltage Track Lighting Worksheet	-----	-----	-----

Installation Certificate		
Component	Form Name	Standards Reference
Envelope	ENV-INST	10-103(a)3A
Mechanical	MECH-INST	10-103(a)3A
Lighting	LGT-INST	10-103(a)3A
Outdoor Lighting	OTLG-INST	10-103(a)3A
Sign Lighting	SLTG-INST	10-103(a)3A
Refrigerated Warehouse	RWH-INST	10-103(a)3A

## Certificate of Acceptance

Component	Form Name	Standards Reference	Reference Nonresidential Appendix
	ENV-1A, LTG-1A, OTLG -1A, MECH-1A, <i>is no longer used and has been deleted.</i>	N/A	N/A
Envelope	ENV-2A – Fenestration Acceptance	10-111 & §116	NA7.4.1
Mechanical	MECH-2A - Ventilation Systems - Variable Air and Constant Volume Systems	10-103(b)4 & §121(b)2, §125(a)1	NA7.5.1.1 NA7.5.1.2
	MECH-3A – Constant-Volume, Single-Zone, Unitary A/C and Heat Pumps	§121(c)2, §122 & §125(a)2	NA7.5.2
	MECH-4A - Air Distribution Systems -	§125(a)3 & §144(k)	NA7.5.3
	MECH-5A – Air Economizer Controls	§125(a)4 & §144(e)	NA7.5.4
	MECH-6A - Demand Control Ventilation (DVC)	§121(c)4, §121(c)4E & §125(a)5	NA7.5.5
	MECH-7A - Supply Fan Variable Flow Controls (VFC)	§125(a)6 & §144(c)2C & §144(c)2D	NA7.5.6
	MECH-8A – Valve Leakage Test	§125(a)8, §125(a)9 & §144(j)1, §144(j)5 & §144(j)6	NA7.5.7
	MECH-9A - Supply Water Temperature Reset	§125(a)8 & 144(j)4	NA7.5.8
	MECH-10A - Hydronic System Variable Flow Control	§125(a)7 & §144(j), §144(j)1 & §144(j)5, §144(j)6	NA7.5.9
	MECH-11A - Automatic Demand Shed Control Acceptance	§122(h) & 125(a)10	NA7.5.10
	MECH-12A - Fault Detection & Diagnostics for DX Units	§125(a)11	NA7.5.11
	MECH-13A - Automatic Fault Detection & Diagnostics for Air Handling & Zone Terminal Units	§125(a)12	NA7.5.12
	MECH-14A - Distributed Energy Storage DX AC Systems Test	§125(a)13	NA7.5.13
	MECH-15A - Thermal Energy Storage (TES) Systems	§125(a)14	NA7.5.14
Indoor Lighting	LTG-2A and LTG-3A - Lighting Controls and Automatic Daylighting	§119(d), §119(e), §119(f) & §131(d)	NA7.6.2, 6.3 and 6.4, NA7.6.1
Outdoor Lighting	OLTG-2A – Outdoor Motion Sensor and Lighting Shut-off Controls	§119(d), §132(a) & §132(c)	NA7.7.1 & NA7.7.2

## Certificate of Field Verification and Diagnostic Testing

Component	Form Name	Standards Reference	Reference Nonresidential Appendix
Mechanical	MECH-4-HERS - Air Distribution System Leakage Diagnostic	10-103(a)5	NA1; NA2

(Page 3 of 6)      **ENV-3C**

Climate Zone:

## Occupancy Type and Coefficients Tables

☐ Retail, See Table NA5-5Sum of Total Standard Design

- See Nonresidential Manual Examples in Section 3.7.1 for details.



(Page 2 of 4)      **LTG-1C**

Project Name:	Date:
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**Certificates of Acceptance, LTG-2A and LTG-3A** (Retain a copy and verify form is completed and signed.) ☐ **Field Inspector**

☐ *The actual indoor lighting power listed below includes all installed permanent and portable lighting systems in accordance with §146(a)*

	Luminaire Schedule (Type, Lamps, Ballasts)	Installed Watts
--	--	-----------------

[illegible]

Building total number of pages		<div>Installed Watts Building Total</div> <div>(Sum of all pages)</div>	
--------------------------------	--	---	--

1. Wattage shall be determined according to Section 130(d and e). Wattage shall be rating of light fixture, not rating of bulb.  
2. If Fail then describe on Page 2 of the Inspection Checklist Form and take appropriate action to correct. Verify building plans if necessary.

(Page 4 of 4)      LTG-1C

Date:

Indoor Lighting Power for Conditioned Spaces			Indoor Lighting Power for Unconditioned Spaces				
Installed Lighting (from Conditioned LTG-1C Page 2)	Watts		Installed Lighting (from Unconditioned LTG-1C Page 2)	Watts			
Lighting Control Credit Conditioned Spaces (from LTG-2C )	-		Lighting Control Credit Unconditioned Spaces (from LTG-2C)	-			
Adjusted <b>Installed</b> Lighting Power	=		Adjusted <b>Installed</b> Lighting Power	=			
Complies if <b>Installed</b> ≤ <b>Allowed</b> $\updownarrow$			Complies if <b>Installed</b> ≤ <b>Allowed</b> $\updownarrow$				
<b>Allowed</b> Lighting Power Conditioned Spaces (from LTG-3C)			<b>Allowed</b> Lighting Power Unconditioned Spaces (from LTG-3C)				

**Designer:**

*This form is to be used by the designer and attached to the plans. Listed below is the acceptance test for the Lighting system, **LTG-2A and LTG-3A**. The designer is required to check the acceptance tests and list all control devices serving the building or space shall be certified as meeting the Acceptance Requirements for Code Compliance. If all the lighting system or control of a certain type requires a test, list the different lighting and the number of systems. The NA7 Section in the Appendix of the Nonresidential Reference Appendices Manual describes the test. Since this form will be part of the plans, completion of this section will allow the responsible party to budget for the scope of work appropriately. **Forms can be grouped by type of Luminaire controlled.***

**Enforcement Agency:**

**Systems Acceptance.** Before Occupancy Permit is granted for a newly constructed building or space or when ever new lighting system with controls is installed in the building or space shall be certified as meeting the Acceptance Requirements.

*The **LTG-2A and LTG-3A** forms are not considered a complete form and are not to be accepted by the enforcement agency unless the boxes are checked and/or filled and signed. In addition, a Certificate of Acceptance forms shall be submitted to the enforcement agency that certifies plans, specifications, installation certificates, and operating and maintenance information meet the requirements of §10-103(b) of Title 24 Part 6. The field inspector must receive the properly filled out and signed forms before the building can receive final occupancy. A copy of the **LTG-2A and LTG-3A** for each different lighting luminaire control(s) must be provided to the owner of the building for their records.*

[illegible]

<b>CERTIFICATE OF ACCEPTANCE</b>		<b>LTG-3A</b>
<b>Automatic Daylighting Control Acceptance Document</b>		<b>(Page 1 of 10)</b>
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	
Enforcement Agency:	Permit Number:	
<i>Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.</i>	Enforcement Agency Use: Checked by/Date	

#### FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
- I certify that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.

Company Name:		
Field Technician's Name:	Field Technician's Signature:	
	Date Signed:	Position With Company (Title):

#### RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.
- I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

Company Name:		Phone:
Responsible Person's Name:	Responsible Person's Signature:	
License:	Date Signed:	Position With Company (Title):

#### Check boxes for all pages of this LTG-3A completed and included in this submittal

<input type="checkbox"/>	LTG-3A Page 2	Construction Inspection. This page required for all submittals.
<input type="checkbox"/>	LTG-3A Page3 & 4	Continuous dimming control functional performance test – watt-meter or amp-meter measurement
<input type="checkbox"/>	LTG-3A Page5 & 6	Stepped Switching/ Stepped Dimming functional performance test – watt-meter or amp-meter measurement
<input type="checkbox"/>	LTG-3A Page7 & 8	Continuous dimming control functional performance test – light meter power measurement, and default look-up table of fraction of rated power versus fraction of rated light output.
<input type="checkbox"/>	LTG-3A Page9 & 10	Stepped Switching/ Stepped Dimming functional performance test – based on light output

<b>CERTIFICATE OF ACCEPTANCE</b>		<b>LTG-3A</b>
<b>Automatic Daylighting Control Acceptance Document</b>		<b>(Page 2 of 10)</b>
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	

<b>I. Construction Inspection NA-7.6.1.1</b>		
<b>1 Drawing of Daylit Area(s) must be shown on plans or attached to this form. Select one or both of the following:</b>		
<input type="checkbox"/> Shown on plans page #'s _____		
<input type="checkbox"/> Daylit area(s) drawn in on as-built plans (attached) page #'s _____		

Check box below if sampling method is used in accordance with NA7.6.1.2. If checked, attach a page with names of other controls in sample (only for buildings with > 5 daylight control systems, sample group glazing same orientation)

Control System	System Name	Plans Page Number	Check if Tested Control is Representative of Sample	Applicable Control System		
				A	B	C
<b>A</b>	_____		<input type="checkbox"/>			
<b>B</b>	_____		<input type="checkbox"/>			
<b>C</b>	_____		<input type="checkbox"/>			
<b>2 System Information</b>						
Zone Type: Skylit (Sky), Primary Sidelit (PS), or Secondary Sidelit (SS)						
Control Type: Continuous Dimming with more than 10 light levels (C), Stepped Dimming (SD), Switching (SW)						
Design Footcandles: (enter number or "Unknown")						
<b>3 Sensor and Controls</b>						
Control Loop Type: Open Loop (OL), Closed Loop (CL)						
Sensor Location: Outside (O), Inside Skylight (IS), Near Windows facing out (NW), In Controlled Zone (CZ)						
Sensor Location is Appropriate to Control Loop Type: (Y/N) If control loop type is Open Loop (OL): Enter yes (Y) if location = Outside (O), Inside Skylight (IS), or Near Windows facing out (NW); otherwise, enter no (N). If Control loop type is Closed Loop (CL): Enter yes (Y) if location = In Controlled Zone (CZ); otherwise, enter no (N).						
Control Adjustments are in Appropriate Location (Y/N): Yes, If Readily Accessible or Yes if in Ceiling ≤ 11 ft, No for all other.						
<b>4 Has documentation been provided by the installer:</b>						
Installation Manuals and Calibration Instructions Provided to Building Owner: (Y/N)						
Location of Light Sensor on Plans: (Y/N)						
Location of Light Sensor on Plans: (Page Number)						
<b>5 Separate Controls of Luminaires in Daylit Areas:</b>						
Are luminaires controlled by automatic daylighting controls only in daylit areas: (Y/N)						
Separately circuited for daylit areas by windows and daylit areas under skylights: (Y/N)						
<b>6 Daylighting control device certification</b>						
Daylighting control has been certified in accordance with §119: (Y/N)						
<b>Construction Inspection PASS/FAIL.</b> If all responses on this <b>Construction Inspection</b> page are complete and all Yes/No questions have a Yes (Y) response, the tests PASS; If any responses on this page are incomplete OR there are any no (N) responses, the tests <b>FAIL</b>						

<b>CERTIFICATE OF ACCEPTANCE</b>		<b>LTG-3A</b>
<b>Automatic Daylighting Control Acceptance Document</b>		<b>(Page 3 of 10)</b>
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	

<b>II. Functional Performance Testing – Continuous Dimming Systems NA-7.6.1.2</b> <b>Power estimation using amp-meter measurement, or alternate option – watt-meter measurement</b>						
Complete all tests on page 3 of 10 (No Daylight Test, Full Daylight Test, and Partial Daylight Test) and fill out Pass/Fail section on Page 4 of 10.			<b>Applicable Control System</b>			
			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 33%; text-align: center;">A</th> <th style="width: 33%; text-align: center;">B</th> <th style="width: 33%; text-align: center;">C</th> </tr> </table>	A	B	C
A	B	C				
System Information						
a.	Control Loop Type: Open Loop or Closed Loop? ( <b>O or C</b> )					
b.	Indicate if Mandatory control - M (required for skylit area or primary sidelit area > 2,500 sf); for Control Credit – CC; or Voluntary not for credit -V ( <b>M, CC, V</b> )					
c.	If automatic daylighting controls are mandatory, are all general lighting luminaires in daylight areas controlled by automatic daylight controls? (Y/N)					
d.	Documented <b>general lighting design footcandles</b> . (Enter footcandle value or “Unknown” (U))					
e.	<b>Power estimation method</b> . Measured Amps Multiplied by Volts, Volt-Amps (VA), alternate option is Measured Watts (W),					
Step 1: Identify Reference Location (location where minimum daylight illuminance is measured in area served by the controlled lighting.)						
f.	Method Used: Illuminance or Distance? ( <b>I or D</b> )					
Override daylight control system and drive electric lights to full light output for the following:						
g.	<b>Full load fc</b> – enter measured footcandles (fc) from controlled electric lighting (does not include daylight illuminance)					
h.	<b>Full load power</b> . Enter measured Amps times Volts, Volt-Amps (VA) or measured Watts.					
Step 2: No Daylight Test controls enabled & daylight less than 1 fc at reference location						
i.	Method Used: Night time manual measurement ( <b>Night</b> ), Night Time Illuminance Logging ( <b>Log</b> ), Cover Fenestration ( <b>CF</b> ), Cover Open Loop Photosensor ( <b>COLP</b> )					
j.	<b>Reference Illuminance</b> (footcandles) as measured at <b>Reference Location</b> (see Step 1) . Enter footcandles					
k.	<b>Enter Y if either of the following statements are true:</b> [Reference Illuminance (line j)] / [Full load fc (line g)] > 90%? or [Reference Illuminance (line j)] / [design footcandles (line d)] > 90%? (Y/ N)					
Step 3: Full Daylight Test conducted when daylight greater than reference illuminance (line j)						
l.	Enter measured Amps Multiplied by Volts, Volt-Amps (VA) or measured Watts (W).					
m.	<b>System power reduction</b> enter [1 – (line l)/(line h)] enter as percent.					
n.	Is System Power Reduction (line m) > 65% ( <b>Y/N</b> )					
o.	With uncontrolled lights also on, no lamps are dimmed outside of daylit area by control ( <b>Y/N</b> )					
p.	Dimmed lamps have stable output (no perceptible visual flicker) ( <b>Y/N</b> )					
Step 4: Partial Daylight Test conducted when daylight between 60% and 95% of (line j)						
q.	<b>Daylight illuminance</b> (light level without electric light) measured at Reference Location (fc)					
r.	Daylight illuminance divided by the Reference Illuminance = (line q )/ (line j). Enter %.					
s.	Is Ratio of Daylight illuminance to Ref illuminance (line r) between 60% and 95%? ( <b>Y/N</b> )					
t.	Total (daylight + electric light) illuminance measured at the Reference Location (fc)					
u.	Total illuminance divided by the Reference Illuminance = (line t )/ (line j), Enter %					
v.	Is Total illuminance divided by the Reference illuminance (line u) between 100% and 150%? ( <b>Y/N</b> )					

<b>CERTIFICATE OF ACCEPTANCE</b>		<b>LTG-3A</b>
<b>Automatic Daylighting Control Acceptance Document</b>		<b>(Page 4 of 10)</b>
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	

<b>III.</b>	<b>PASS/FAIL Evaluation (check one):</b>	<p><input type="checkbox"/> <b>PASS:</b> All applicable <b>Construction Inspection</b> responses on page 2 of 10 are complete and all applicable <b>Functional Performance Testing Requirements</b> responses are positive (<b>Y - yes</b>) (applicable questions on page 3 of 10 = c, k, n, o, p, s, v)</p> <p><input type="checkbox"/> <b>FAIL:</b> Any applicable <b>Construction Inspection</b> responses on page 2 of 10 are incomplete OR there is one or more negative (N - no) responses in any applicable <b>Functional Performance Testing Requirements</b> section (applicable questions on page 3 of 10 = c, k, n, o, p, s, v). System does not pass and is NOT eligible for Certificate of Occupancy according to Section 10-103(a)3B. Fix problem(s) and retest until the system(s) passes all portions of this test before retesting and resubmitting LTG-3A with PASSED test to the enforcement agency. Describe below the failure mode and corrective action needed.</p> <div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div> <div style="border: 1px solid black; height: 30px; margin-top: 5px;"></div> <div style="border: 1px solid black; height: 30px; margin-top: 5px;"></div> <div style="border: 1px solid black; height: 30px; margin-top: 5px;"></div>
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<b>CERTIFICATE OF ACCEPTANCE</b>		<b>LTG-3A</b>
<b>Automatic Daylighting Control Acceptance Document</b>		<b>(Page 5 of 10)</b>
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	

<b>II. NA7.6.1.2 Functional Performance Testing – Stepped Switching/ Stepped Dimming Systems</b>			
<b>Power estimation using watt-meter or amp-meter measurement</b>			
Complete all tests on pages 5 & 6 of 10 (No Daylight Test, Full Daylight Test, and Partial Daylight Test) and fill out Pass/Fail section on Page 6 of 10.		<b>Applicable Control System</b>	
		A	B
		C	
<b>System Information</b>			
a.	Control Loop Type. Open Loop or Closed Loop? ( <b>O or C</b> )		
b.	Indicate if Mandatory control - M (required for skylit area or primary sidelit area > 2,500 sf); for Control Credit – CC; or Voluntary not for credit -V ( <b>M, CC, V</b> )		
c.	If automatic daylighting controls are mandatory, are all general lighting luminaires in daylight areas controlled by automatic daylight controls? (Y/N)		
d.	<b>Power estimation method.</b> Measured Watts (W), Measured Amps Multiplied by Volts, Volt-Amps (VA),		
<b>Step 1: Identify Reference Location</b> (location where minimum daylight illuminance is measured in area served by the controlled lighting.)			
e.	Method Used: Illuminance or Distance? ( <b>I or D</b> )		
<b>Step 2: No Daylight Test</b> (daylight less than 1 fc at reference location)			
f.	Method Used: Night time manual measurement ( <b>Night</b> ), Night Time Illuminance Logging ( <b>Log</b> ) attach plot of fc or power, Cover Fenestration ( <b>CF</b> ), Cover Photosensor ( <b>CP</b> )		
g.	<b>Reference Illuminance</b> (foot-candles) measured at Reference Location		
h.	Enter measured Watts (W), or Amps Multiplied by Volts, Volt-Amps (VA)		
i.	All controlled lights turn on and are at top dimming step? ( <b>Y/N</b> )		
<b>Step 3: Full Daylight Test</b> conducted when daylight > reference illuminance (line g)			
j.	Measured <b>Watts of Volt-Amps</b> - record system power		
k.	System fraction of power reduction = [1-(line k) / (line h)],		
l.	Is System Power Reduction (k) > 65% ( <b>Y/N</b> )		
<b>Step 4: Partial Daylight Test</b>			
m.	Method Used: Light Logging ( <b>Log</b> ), Partially Cover Fenestration ( <b>PCF</b> ), Open Loop Setpoint Adjustment ( <b>OLSA</b> )		
n.	If the control has three steps of control or less, all steps of control are tested. If the control has more than three steps, testing three steps of control is sufficient for showing compliance. Tests have been conducted at various daylight levels that correspond to steps of electric lighting control. ( <b>Y/N</b> )		

<b>CERTIFICATE OF ACCEPTANCE</b>		<b>LTG-3A</b>
<b>Automatic Daylighting Control Acceptance Document</b>		<b>(Page 6 of 10)</b>
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	

<b>II.NA7.6.1.2 Functional Performance Testing – Stepped Switching/ Stepped Dimming Systems</b> <b>(continued)</b>
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		Applicable Control System		
		A	B	C
<b>First Stage of Control</b>				
F1	Total (daylight + electric light) illuminance measured at the Reference Location (foot-candles) when stage turns off or dims			
F2	Is the measured total illuminance between 100% and 150% of the Reference Illuminance (line g)? (Y/N)			
F3	With time delay disabled, control stage does not cycle (i.e. deadband is sufficient)? (Y/N)			
<b>Second Stage of Control</b>				
F4	Total (daylight + electric light) illuminance measured at the Reference Location (foot-candles) when stage turns off or dims			
F5	Is the measured total illuminance between 100% and 150% of the Reference Illuminance (line g)? (Y/N)			
F6	With time delay disabled, control stage does not cycle (i.e. deadband is sufficient)? (Y/N)			
<b>Third Stage of Control</b>				
F7	Total (daylight + electric light) illuminance measured at the Reference Location (foot-candles) when stage turns off or dims			
F8	Is the measured total illuminance between 100% and 150% of the Reference Illuminance (line g)? (Y/N)			
F9	With time delay disabled, control stage does not cycle (i.e. deadband is sufficient)? (Y/N)			
<b>Step 5: Time Delay Test</b> (conduct at least 60 minutes after overriding time delay)				
r.	After change of state from little daylight to full daylight, time in minutes before light output is reduced			
s.	Is the measured time delay (line r) greater than or equal to 3 minutes? (Y/N)			

<b>III.</b>	<b>PASS/FAIL Evaluation (check one):</b>  <input type="checkbox"/> <b>PASS:</b> All applicable <b>Construction Inspection</b> responses on page 2 of 10 are complete and all applicable <b>Functional Performance Testing Requirements</b> responses are positive ( <b>Y - yes</b> ) (applicable questions on pages 5 & 6 of 10 are on lines c, i, l, m, n, F2, F3, F5, F6, F8, F9, s)  <input type="checkbox"/> <b>FAIL:</b> Any applicable <b>Construction Inspection</b> responses on page 2 of 10 are incomplete OR there is one or more negative (N - no) responses in any applicable <b>Functional Performance Testing Requirements</b> section (applicable questions on pages 5 & 6 of 10 are on lines c, i, l, m, n, F2, F3, F5, F6, F8, F9, s). System does not pass and is NOT eligible for Certificate of Occupancy according to Section 10-103(a)3B. Fix problem(s) and retest until the system(s) passes all portions of this test before retesting and resubmitting LTG-3A with PASSED test to the enforcement agency. Describe below the failure mode and corrective action needed.



<b>CERTIFICATE OF ACCEPTANCE</b>		<b>LTG-3A</b>
<b>Automatic Daylighting Control Acceptance Document</b>		<b>(Page 7 of 10)</b>
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	

<b>II. Functional Performance Testing – Continuous Dimming Systems NA-7.6.1.2</b>						
<b>Power estimation using light meter measurement</b>						
Complete all tests on page 7 & 8 of 10 (No Daylight Test, Full Daylight Test, and Partial Daylight Test) and fill out Pass/Fail section on Page 8 of 10.			<b>Applicable Control System</b>			
			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 33%; text-align: center;">A</th> <th style="width: 33%; text-align: center;">B</th> <th style="width: 33%; text-align: center;">C</th> </tr> </table>	A	B	C
A	B	C				
<b>System Information</b>						
a.	Control Loop Type: Open Loop or Closed Loop? ( <b>O</b> or <b>C</b> )					
b.	Indicate if Mandatory control - M (required for skylit area or primary sidelit area > 2,500 sf); for Control Credit – CC; or Voluntary not for credit -V ( <b>M, CC, V</b> )					
c.	If automatic daylighting controls are mandatory, are all general lighting luminaires in daylight areas controlled by automatic daylight controls? (Y/N)					
d.	Documented <b>general lighting design footcandles</b> . If design footcandles not documented leave blank (enter fc)					
e.	<b>Power estimation method.</b> (see line r) Default ratio of power to light (Dfc), cut-sheet ratio of power to light (CSfc) If CSfc – attach cut-sheet. Enter <b>Dfc</b> or <b>CSfc</b> ,					
<b>Step 1: Identify Reference Location</b> (location where minimum daylight illuminance is measured in area served by the controlled lighting.).						
f.	Method Used: Illuminance or Distance? ( <b>I</b> or <b>D</b> )					
Override daylight control system and drive electric lights to full light output for full load fc.:						
g.	<b>Full load fc</b> – enter measured controlled electric lighting footcandles (fc)					
<b>Step 2: No Daylight Test</b>						
h.	Method Used: Night time manual measurement ( <b>Night</b> ), Night Time Illuminance Logging ( <b>Log</b> ), Cover Fenestration ( <b>CF</b> ), Cover Open Loop Photosensor ( <b>COLP</b> )					
i.	<b>Reference Illuminance</b> (footcandles) measured at Reference Location (Illuminance of general lighting at the reference location)					
j.	<b>Enter Y if either of the following statements are true:</b> [Reference Illuminance (line i)] / [Full Load fc (line g)] > 90%? or [Reference Illuminance (line i)] / [design footcandles (line d)] > 90%? (Y/ N)					
<b>Step 3: Full Daylight Test</b> conducted when daylight > reference illuminance (line i)						
k.	Daylight illuminance (light level with electric lighting turned off) measured at Reference Location (fc)					
l.	Daylight illuminance (line k) greater than Reference Illuminance (line i) ? (Y/N)					
m.	<b>Fraction controlled wattage turned off.</b> Enter %.					
n.	Fraction of controlled wattage dimmed [1 – (line m)] Enter %.					
Fill out lines o through r only if fraction of controlled wattage turned off (line m) < 100%.						
o.	Total (daylight + electric light) illuminance measured at the Reference Location (fc)					
p.	<b>Electric lighting illuminance</b> at the Reference Location (fc) [(line o) – (line k)]					
q.	Electric lighting illuminance (line p) divided by Full load fc (line g). Enter %					
r.	<b>Dimmed luminaire fraction of rated power.</b> Attach manufacturer's cut-sheet or use default graph of rated power to light output on bottom of page 8 of 10. Label applicable control system (column A, B or C) on cut-sheet or graph. Enter fraction of rated power in %.					
s.	<b>System Power Reduction</b> = [1 – (line n) * (line r)]					
t.	Is System Power Reduction (line s) > 65% (Y/N)					
u.	With uncontrolled lights also on, no lamps dimmed outside of daylit area by control (Y/N)					
v.	Dimmed lamps have stable output, no perceptible flicker (Y/N)					

Project Name/Address:

System Name or Identification/Tag:

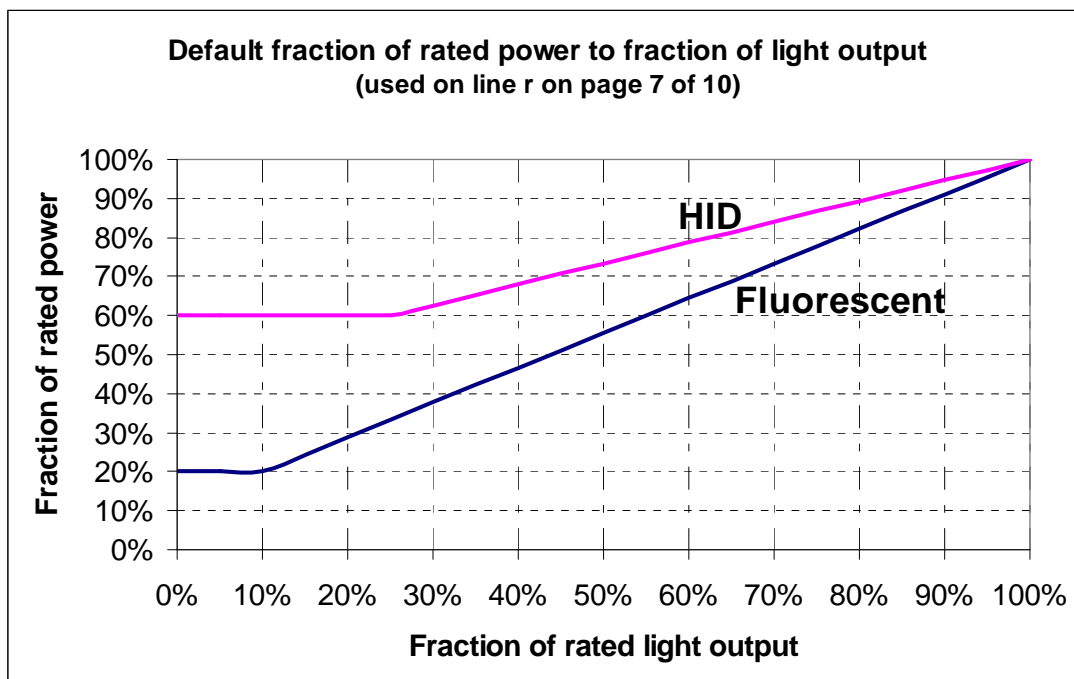
System Location or Area Served:

**II. Functional Performance Testing – Continuous Dimming Systems NA-7.6.1.2 (continued)**

		Applicable Control System		
		A	B	C
<b>Step 4: Partial Daylight Test</b> conducted when daylight between 60% and 95% of (line i)				
w.	Daylight illuminance (light level without electric light) measured at Reference Location (fc)			
x.	Daylight illuminance divided by the Reference Illuminance = (line w)/ (line i). Enter %			
y.	Is Ratio of Daylight illuminance to Ref illuminance (line x) between 60% and 95%? (Y/N)			
z.	Total (daylight + electric light) illuminance measured at the Reference Location (fc)			
aa.	Total illuminance divided by the Reference Illuminance = (line z) / (line i). Enter %			
ab.	Is Ratio of Total illum. to Reference illum. (line aa) between 100% and 150%? (Y/N)			

**III. PASS/FAIL Evaluation (check one):**

- ☐ **PASS:** All applicable **Construction Inspection** responses on page 2 of 10 are complete and all applicable **Functional Performance Testing Requirements** responses are positive (**Y - yes**) (applicable questions on page 7 of 10 = c, j, l, t, u, v, y, ab)
- ☐ **FAIL:** Any applicable **Construction Inspection** responses on page 2 of 10 are incomplete OR there is one or more negative (N - no) responses in any applicable **Functional Performance Testing Requirements** section (applicable questions on page 7 of 10 = c, j, l, t, u, v, y, ab). System does not pass and is NOT eligible for Certificate of Occupancy according to Section 10-103(a)3B. Fix problem(s) and retest until the system(s) passes all portions of this test before retesting and resubmitting LTG-3A with PASSED test to the enforcement agency. Describe below the failure mode and corrective action needed.



<b>CERTIFICATE OF ACCEPTANCE</b>		<b>LTG-3A</b>
<b>Automatic Daylighting Control Acceptance Document</b>		<b>(Page 9 of 10)</b>
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	

<b>II. NA7.6.1.2 Functional Performance Testing – Stepped Switching/ Stepped Dimming Systems</b>			
<b>Power estimation based on light output</b>			
Complete all tests on page 9 & 10 of 10 (No Daylight Test, Full Daylight Test, and Partial Daylight Test) and fill out Pass/Fail section on Page 10 of 10.		<b>Applicable Control System</b>	
		A	B
		C	
<b>System Information</b>			
a.	Open Loop or Closed Loop? ( <b>O or C</b> )		
b.	Indicate if Mandatory control - M (skylit area or primary sidelit area > 2,500 sf); for Control Credit – CC; or Voluntary not for credit -V ( <b>M, CC, V</b> )		
c.	If automatic daylighting controls are mandatory, are all general lighting luminaires in daylight areas controlled by automatic daylight controls? (Y/N)		
d.	<b>Power estimation method.</b> Counting (C) – not allowed for step dimming, Counting plus Cut Sheet (C+CS) attach ballast cut sheet with steps of power and light.		
<b>Step 1: Identify Reference Location</b> (location where minimum daylight illuminance is measured in area served by the controlled lighting.)			
e.	Method Used: Illuminance or Distance? ( <b>I or D</b> )		
<b>Step 2: No Daylight Test</b>			
f.	Method Used: Night time manual measurement ( <b>Night</b> ), Night Time Illuminance Logging ( <b>Log</b> ) attach plot of fc or power, Cover Fenestration ( <b>CF</b> ), Cover Photosensor ( <b>CP</b> )		
g.	Reference Illuminance (foot-candles) measured at Reference Location		
h.	All controlled lights turn on and are at top dimming step? (Y/N)		
<b>Step 3: Full Daylight Test</b> conducted when daylight > reference illuminance (line g)			
i.	Fraction system wattage turned off		
j.	Fraction of system wattage dimmed		
k.	Step dimming level as a fraction of rated light output if applicable		
l.	Dimmed ballast fraction of rated power from cut-sheet		
m.	<b>System Power Reduction</b> = [1 – (line j)*(line l)]		
n.	Is System Power Reduction (line m) > 65% (Y/N)		
o.	With uncontrolled lights also on, no lamps controlled outside of daylit area (Y/N)		
p.	Dimmed lamps have stable output, no perceptible visual flicker (Y/N)		
<b>Step 4: Partial Daylight Test</b>			
q.	Method Used: Light Logging ( <b>Log</b> ), Partially Cover Fenestration ( <b>PCF</b> ), Open Loop Setpoint Adjustment ( <b>OLSA</b> )		
r.	If the control has three steps of control or less, all steps of control are tested. If the control has more than three steps, testing three steps of control is sufficient for showing compliance. Tests have been conducted at various daylight levels that correspond to steps of electric lighting control. (Y/N)		

<b>CERTIFICATE OF ACCEPTANCE</b>		<b>LTG-3A</b>
<b>Automatic Daylighting Control Acceptance Document</b>		<b>(Page 10 of 10)</b>
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	

<b>II.NA7.6.1.2 Functional Performance Testing – Stepped Switching/ Stepped Dimming Systems (continued)</b>				
		Applicable Control System		
		A	B	C
<b>First Stage of Control</b>				
F1	Total (daylight + electric light) illuminance measured at the Reference Location (foot-candles) when stage turns off or dims			
F2	Is the measured total illuminance between 100% and 150% of the Reference Illuminance (line g)? (Y/N)			
F3	With time delay disabled, control stage does not cycle (i.e. deadband is sufficient)? (Y/N)			
<b>Second Stage of Control</b>				
F4	Total (daylight + electric light) illuminance measured at the Reference Location (foot-candles) when stage turns off or dims			
F5	Is the measured total illuminance between 100% and 150% of the Reference Illuminance (line g)? (Y/N)			
F6	With time delay disabled, control stage does not cycle (i.e. deadband is sufficient)? (Y/N)			
<b>Third Stage of Control</b>				
F7	Total (daylight + electric light) illuminance measured at the Reference Location (foot-candles) when stage turns off or dims			
F8	Is the measured total illuminance between 100% and 150% of the Reference Illuminance (line g)? (Y/N)			
F9	With time delay disabled, control stage does not cycle (i.e. deadband is sufficient)? (Y/N)			
<b>Step 5: Time Delay Test</b> (conduct at least 60 minutes after overriding time delay)				
s.	After change of state from little daylight to full daylight, time in minutes before light output is reduced			
t.	Is the measured time delay (line s) greater than or equal to 3 minutes? (Y/N)			
<b>III. PASS/FAIL Evaluation (check one):</b> <input type="checkbox"/> <b>PASS:</b> All applicable <b>Construction Inspection</b> responses on page 2 of 10 are complete and all applicable <b>Functional Performance Testing Requirements</b> responses are positive ( <b>Y - yes</b> ) (applicable questions on pages 9 & 10 of 10 are on lines c, h, n, o, p, r, F2, F3, F5, F6, F8, F9, t) <input type="checkbox"/> <b>FAIL:</b> Any applicable <b>Construction Inspection</b> responses on page 2 of 10 are incomplete OR there is one or more negative (N - no) responses in any applicable <b>Functional Performance Testing Requirements</b> section (applicable questions on pages 9 & 10 of 10 are on lines c, h, h, o, p, r, F2, F3, F5, F6, F8, F9, t). System does not pass and is NOT eligible for Certificate of Occupancy according to Section 10-103(a)3B. Fix problem(s) and retest until the system(s) passes all portions of this test before retesting and resubmitting LTG-3A with PASSED test to the enforcement agency. Describe below the failure mode and corrective action needed. <div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div> <div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div> <div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div>				

<b>Certificate of Compliance</b>			(Page 3 of 4)	<b>OLTG-1C</b>
Project Name:			Date:	
<b>A. OUTDOOR LIGHTING ZONE</b>				
OUTDOOR LIGHTING ZONE: <input type="checkbox"/> OLZ 1 <input type="checkbox"/> OLZ 2 <input type="checkbox"/> OLZ 3 <input type="checkbox"/> OLZ 4				
Is the Outdoor Lighting Zone: <input type="checkbox"/> Default in accordance with §10-114, or <input type="checkbox"/> Amended by JHA				
Complete the information below if the default Outdoor Lighting Zone has been amended by the local jurisdiction having authority (JHA):				
<input type="checkbox"/> The site is a government designated park, recreation area, wildlife preserve, or portion thereof, and has been designated as LZ2 or LZ3, in accordance with Table 10-114-A, because the site is contained within such a zone. <input type="checkbox"/> The local jurisdiction having authority has officially adopted a change to the State Default Lighting Zone and has notified the Energy Commission by providing the materials required in §10-114(d) to the Executive Director. <input type="checkbox"/> The adopted change is posted on the Energy Commission website.				
<b>B. ADDITIONAL LIGHTING POWER ALLOWANCE FOR ORDINANCE REQUIREMENTS</b>				
Are additional lighting power allowances for ordinance in Table 147-C used? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Complete the information below if additional lighting power allowances for ordinance requirements are used:				
<input type="checkbox"/> The local jurisdiction having authority has officially adopted specific outdoor light levels, which are expressed as average or minimum footcandle levels, by following a public process that allowed for formal public notification, review, and comment about the proposed change. <input type="checkbox"/> The local jurisdiction having authority which adopted specific outdoor light levels and has notified the Commission by providing the following materials required §10-114(f) to the Executive Director.				
<b>C. ACCEPTANCE FORMS</b>				
<b>Required Acceptance Tests</b>				
<b>Designer:</b>				
<i>This form is to be used by the designer and attached to the plans. Listed below is the acceptance test for the Lighting system, <b>OLTG-2A</b>. The designer is required to check the acceptance tests and list all control devices serving the building or space shall be certified as meeting the Acceptance Requirements for Code Compliance. If all the lighting system or control of a certain type requires a test, list the different lighting and the number of systems. The NA7 Section in the Appendix of the Nonresidential Reference Appendices Manual describes the test. Since this form will be part of the plans, completion of this section will allow the responsible party to budget for the scope of work appropriately. <b>Forms can be grouped by type of Luminaire controlled.</b></i>				
<b>Enforcement Agency:</b>				
<i><b>Systems Acceptance.</b> Before Occupancy Permit is granted for a newly constructed building or space or when ever new lighting system with controls is installed in the building or space shall be certified as meeting the Acceptance Requirements. The <b>OLTG-2A</b> form is not considered a complete form and is not to be accepted by the enforcement agency unless the boxes are checked and/or filled and signed. In addition, a Certificate of Acceptance forms shall be submitted to the enforcement agency that certifies plans, specifications, installation certificates, and operating and maintenance information meet the requirements of §10-103(b) of Title 24 Part 6. The field inspector must receive the properly filled out and signed forms before the building can receive final occupancy. A copy of the <b>OLTG-2A</b> for each different lighting luminaire control(s) must be provided to the owner of the building for their records.</i>				
Certificate of Acceptance				
	Luminaires Controlled			OLTG-2A <sup>1</sup>
Equipment Requiring Testing	Description	Number of Like Controls	Location	Outdoor Lighting Acceptance Tests
1. Insert: <b>OMS</b> for Outdoor Motion Sensor; <b>OLSC</b> for Outdoor Lighting Shutoff Controls; <b>OP</b> for Outdoor Photocontrol; <b>ATS</b> for Astronomical Time Switch; and, <b>STS</b> for Standard (non-astronomical) Time Switch acceptance.				

<b>CERTIFICATE OF COMPLIANCE</b>		<b>MECH-1C-ALT-HVAC</b>
<b>Prescriptive HVAC Alterations</b>		<b>(Page 1 of 2)</b>
<b>Project Name/Address:</b>	<b>Date:</b>	

<b>Enforcement Agency:</b>	<b>Permit Number:</b>	<b>Climate Zone</b>
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*NOTE: This form may be used only for single zone constant volume systems. This form shall not be used for newly constructed buildings, additions, or VAV multi-zone systems.*

**Select one "Existing Building Project Type" and complete the corresponding steps listed in the "Complete Steps" column below.** *Note: After installation of HVAC units and/or ducts, the Installation and the applicable Acceptance Forms are required to be submitted for verification by the field inspector and a copy shall be made available to building owner.*

Existing Building Project Type (select one):	Complete Steps:
<input type="checkbox"/> New or Replacement HVAC unit	1, 4, 5 and 6 (If criteria is met), 7 ( When economizer is installed)
<input type="checkbox"/> New or Replacement ducts	1, 4, 5 and 6 (If criteria is met)
<input type="checkbox"/> New Space Conditioning System (HVAC and ducts)	1, 2, 3, 4, 5 and 6 (If criteria is met), 7 (When economizer is installed), 8 (DCV)

**☐ Step 1 – Ducts and HVAC Equipment**

Equipment Type, Efficiency and Capacity <sup>1</sup>	Floor Area Served <sup>2</sup>	Distribution Type and Location <sup>3</sup>	Duct Insulation R-Value <sup>4</sup>	Thermostat Type <sup>5</sup>	Configuration (Central, Split, Package)

1. Indicate Equipment Type; Air Handler, Condenser, Heat Pump, Evap. Cooling, Boiler, Electric Resistance, etc. & HVAC Capacity; or Ducts (new or replaced).
2. If the Floor Area Served (per duct system) exceeds 5,000 square feet, skip Steps 5 and 6.
3. Indicate Type and Location (Ducts on roof, ducts in conditioned space, ducts in attic, etc.)
4. Newly installed or replaced duct insulation: R-8 in unconditioned space or in buried concrete slab; R-4.2 in indirectly conditioned space; and R-0 for conditioned space.
5. Existing non-setback thermostats shall be replaced with setback thermostats for all altered units, and all newly installed space conditioning systems requiring a thermostat shall be equipped with a setback thermostat. Setback thermostats shall meet the requirements of Section 112(c).

**☐ Step 2 – Mechanical Ventilation Calculations**

Both options (Area and Occupancy Basis) shall be completed to determine the minimum mechanical ventilation rates and Column I must be the greater of either Column E or H.

		AREA BASIS			OCCUPANCY BASIS			
A	B	C	D	E	F	G	H	I
Zone/ System	Type of Use	Condition Area (ft <sup>2</sup> )	CFM <sup>1</sup> Per ft <sup>2</sup>	Min CFM <sup>2</sup> C x D	Num of People <sup>2</sup>	CFM per Person	Min CFM <sup>3</sup> F x G	Design Vent. CFM Larger of E or H
						15		
						15		
						15		

**AREA BASIS**

1. Minimum ventilation rate (CFM/ ft<sup>2</sup>) for the Type of Use in the Table below.
2. The conditioned floor area of the space multiplied by the applicable minimum ventilation rate from Table 4-1 CFM/ft<sup>2</sup> Column below. For additional ventilation rates, see Table 4-3 and use the values listed in the *Required Ventilation Column* in the Nonresidential Compliance Manual. This provides dilution for the building-borne contaminants like off-gassing of paints and carpets.

**OCCUPANCY BASIS**

2. For spaces with fixed seating such as a theater or auditorium, the expected number of occupants is the number of fixed seats.
3. The expected number of occupants or people multiplied by 15 cfm per person.

Type of Use	CFM per ft <sup>2</sup>	Type of Use	CFM per ft <sup>2</sup>
Auto repair workshops	1.50	High-rise residential	Ventilation Rates Specified by the CBC
Barber shops	0.40	Hotel guest rooms (less than 500 ft <sup>2</sup> )	30 cfm/guest room
Bars, cocktail lounges, and casinos	0.20	Hotel guest rooms (500 ft <sup>2</sup> or greater)	0.15
Beauty shops	0.40	Retail stores	0.20
Coin-operated dry cleaning	0.30	All Others <sup>1</sup>	0.15
Commercial dry cleaning	0.45		

1. For additional ventilation rates, see Table 4-3 in the Nonresidential Compliance Manual

<b>CERTIFICATE OF COMPLIANCE</b>		<b>MECH-1C-ALT-HVAC</b>
<b>Prescriptive HVAC Alterations</b>		<b>(Page 2 of 2)</b>
<b>Project Name/Address:</b>	<b>Date:</b>	

**Installation Certificate requirement:** The installing contractor shall complete and sign an Installation Certificate (MECH-INST) to certify that the installed HVAC features, materials, components, or manufactured devices (the installation) conforms to all applicable codes and regulations, and the installation is consistent with any required plans and specifications approved by the enforcement agency

**Certificate of Acceptance requirement:** After completing the installation, all required acceptance testing shall be completed, and all applicable Certificate of Acceptance forms are required to be **filled out completely, signed**, and made available to the enforcement agency at final inspection. Copies of the completed, signed Certificate of Acceptance forms shall also be made available to the building owner.

- |   |
|---|
| <input type="checkbox"/> <b>Step 3 - MECH-2A - Outdoor Air Acceptance</b> – This test is required for newly installed or replacement HVAC Systems (HVAC equipment and ducts) to verify minimum outside air is provided in accordance with Section 125 of the Energy Standards.  |
| <input type="checkbox"/> <b>Step 4 – MECH-3A - Constant Volume, Single Zone Unitary A/C and HP Controls Acceptance</b> – This test is required for new or replaced constant volume, single-zone unitary air conditioners and heat pumps to verify controls function, including: thermostat installation and programming, supply fan, heating, cooling, and damper operation in accordance with Section 125 of the Energy Standards.   |
| <input type="checkbox"/> <b>Step 5 – MECH-4A - Air Distribution Systems Acceptance</b> – This test is required when the new or altered system is a <u>single zone, constant volume system serving 5,000 ft<sup>2</sup> or less</u> , and 25% or more of the duct surface area is located in the outdoors, unconditioned space, or a ventilated attic in accordance with Section 125 of the Energy Standards.  |
| <input type="checkbox"/> <b>Step 6 - MECH-4-HERS - Air Distribution System Leakage Diagnostic</b> – This test is required to be completed by a HERS Rater when the new or altered system meets the criteria in Step 5 to verify duct leakage in accordance with Section 125 of the Energy Standards. The HERS Rater shall register the MECH-4-HERS Form with an approved HERS Provider.   |
| <input type="checkbox"/> <b>Step 7 - MECH-5A - Economizer Testing Acceptance</b> - This test is required for newly installed or replacement HVAC equipment when an economizer is installed in accordance with Section 125 of the Energy Standards.  |
| <input type="checkbox"/> <b>Step 8 - MECH-6A - Demand Control Ventilation Systems (DCV) Acceptance</b> - This test is required for newly installed DCV systems or replacement of HVAC equipment with the following characteristics to verify controls and sensors function in accordance with 125 of the Energy Standards. : <b>A.</b> They have an air economizer; and <b>B.</b> They serve a space with a design occupant density, or a maximum occupant load factor for egress purposes greater than or equal to 25 people per 1000 ft <sup>2</sup> (40 square foot per person); and <b>C.</b> They are either:<br>i. Single zone systems with any controls; or<br>ii. Multiple zone systems with Direct Digital Controls (DDC) to the zone level. |

<b>Documentation Author's Declaration Statement</b>	
<ul style="list-style-type: none"> <li>I certify that this Certificate of Compliance documentation is accurate and complete.</li> </ul>	
Name:	Signature:
Company:	Date:
Address:	If Applicable CEA # CEPE #
City/State/Zip	Phone:

<b>Principal Mechanical Designer's Declaration Statement</b>	
<ul style="list-style-type: none"> <li>I am eligible under Division 3 of the California Business and Professions Code to accept responsibility for the mechanical design.</li> <li>This Certificate of Compliance identifies the mechanical features and performance specifications required for compliance with Title 24, Parts 1 and 6 of the California Code of Regulations.</li> <li>The design features represented on this Certificate of Compliance are consistent with the information provided to document this design on the other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.</li> </ul>	
Name:	Signature:
Company Name:	Date:
Address:	License #
City/State/Zip:	Phone:

MECHANICAL VENTILATION AND REHEAT													MECH-3C	
PROJECT NAME											DATE			
MECHANICAL VENTILATION §121(b)2									REHEAT LIMITATION §144(d)					
AREA BASIS				OCCUPANCY BASIS					VAV Minimum					
A	B	C	D	E	F	G	H	I	J	K	L	M	N	
Zone/ System	Condition Area (ft²)	CFM per ft²	Min CFM by Area B x C	Num of People	CFM per Person	Min CFM by Occupant E x F	REQ'D V.A. Max of D or G	Design Ventilation Air cfm	50% of Design Zone Supply cfm	B x 0.4 cfm/ft²	Max of Columns H, J, K, 300 cfm	Design minimum Air setpoint	Transfer Air	
					15									
					15									
					15									
					15									
					15									
					15									
					15									
					15									
					15									
					15									
					15									
					15									
Totals									Column I Total Design Ventilation Air					
C	Minimum ventilation rate per Section §121, Table 121-A.													
E	Based on fixed seat or the greater of the expected number of occupants and 50% of the CBC occupant load for egress purposes for spaces without fixed seating.													
H	Required Ventilation Air (REQ'D V.A.) is the larger of the ventilation rates calculated on an AREA BASIS or OCCUPANCY BASIS (Column D or G).													
I	Must be greater than or equal to H, or use Transfer Air (column N) to make up the difference.													
J	Design fan supply cfm (Fan CFM) x 50%; or the design zone outdoor airflow rate per §121.													
K	Condition area (ft²) x 0.4 cfm/ft²; or													
L	Maximum of Columns H, J, K, or 300 cfm													
M	This must be less than or equal to Column L and greater than or equal to the sum of Columns H plus N.													
N	Transfer Air must be provided where the Required Ventilation Air (Column H) is greater than the Design Minimum Air (Column M). Where required, transfer air must be greater than or equal to the difference between the Required Ventilation Air (Column H) and the Design Minimum Air (Column M), Column H minus M.													



<b>CERTIFICATE OF ACCEPTANCE</b>		<b>MECH-15A</b>
<b>NA7.5.14 Thermal Energy Storage (TES) System Acceptance</b>		<b>(Page 2 of 3)</b>
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	

**Intent:**     *Verify proper operation of distributed energy storage TES systems.*

### Construction Inspection

1. Instrumentation to perform test includes, but not limited to:
  - a. No special instrumentation is required for the acceptance tests.

<b>A. Certificate of Compliance Information</b>				
<i>The following Certificate of Compliance information for both the chiller and the storage tank shall be provided on the plans to document the key TES System parameters and allow plan check comparison to the inputs used in the DOE-2 simulation. DOE-2 keywords are shown in ALL CAPITALS in parentheses.</i>				
<b>a. Chiller</b>	Brand and Model:			
	Type (Centrifugal, Reciprocating, etc):			
	Capacity (tons): (Size)			
	Starting Efficiency (kW/ton): (at beginning of ice production) (COMP-KW/TON-START)			
	Ending Efficiency (kW/ton): (at end of ice production) (COMP-KW/TON-END)			
	Capacity Reduction (% / F): (PER-COMP-REDUCT/F)			
<b>b. Storage Tank</b>	Storage Type (Check): (TES-TYPE)	<input type="checkbox"/> Chilled Water Storage	<input type="checkbox"/> Ice-on-Coil	<input type="checkbox"/> CHS
		<input type="checkbox"/> Ice Harvester	<input type="checkbox"/> Brine	
		<input type="checkbox"/> Ice-Slurry	<input type="checkbox"/> Eutectic Salt	
	Number of tanks (SIZE)			
	Storage Capacity per Tank (ton-hours)			
	Storage Rate (tons): (COOL-STORE-RATE)			
	Discharge Rate (tons): (COOL-SUPPLY-RATE)			
	Auxiliary Power (watts): (PUMP+AUX-KW)			
Tank Area (sq ft): (CTANK-LOSS-COEFF)				
Tank Insulation (R-Value): (CTANK-LOSS-COEFF)				

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# *2008 Compliance Forms*

## *Sign Lighting*

**Certificate of Compliance (Sign Lighting)****(Page 1 of 4)****SLTG-1C**

Project Name:

Date:

Project Address:

Location of Sign

☐ Outdoor Signs☐ Indoor Signs

Phase of Sign Construction

☐ New Signs☐ Sign Alterations

Type of Lighting Control

☐ New Lighting Controls☐ Replaced Lighting Controls☐ Not Installing Lighting Controls

This Certificate of Compliance includes the following components (check all that apply)

☐ Mandatory Measures (Lighting Controls)☐ Maximum Allowed Lighting Power☐ Specific Lighting Sources**1. Certificate of Compliance Declaration Statement** (this may be a C10, C45 or other eligible person)

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am eligible under Division 3 of the California Business and Professions Code to accept responsibility for the lighting design.
- This Certificate of Compliance identifies the lighting features and performance specifications required for compliance with Title 24, Parts 1 and 6 of the California Code of Regulations.
- The design features represented on this Certificate of Compliance are consistent with the information provided to document this design on the other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Name:

Signature

Company:

Phone

Address:

License number (may be contractor's lic #)

City/State/Zip:

Date

**2. Installation Certificate** (to be signed by responsible person after installation)

Permit number

(Enforcement Agency Use )

Checked by/Date

(Enforcement Agency Use )

**Installation Declaration statement**

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am eligible under Division 3 of the Business and Professions Code to accept responsibility for construction, or an authorized representative of the person responsible for construction.
- I certify that the installed features, materials, components, or manufactured devices identified on this certificate conforms to all applicable codes and regulations, and the installation is consistent with the plans and specifications approved by the enforcement agency.
- I certify that the requirements detailed on this Certificate of Compliance have been met.
- I will ensure that a completed, signed copy of this Installation Certificate shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Installation Certificate is required to be included with the documentation the builder provides to the building owner at occupancy.

Company Name:

Responsible Person's Name:

Responsible Person's Signature:

License number (may be contractor's lic #)

Date Signed:

Position With Company:

**Certificate of Compliance (Sign Lighting)****(Page 2 of 4)****SLTG-1C**

Project Name:

Date:

**3. Mandatory Sign Lighting Controls****NOTES:**

1. The same responsible person may install both the sign lighting power and the sign lighting controls, or a different responsible person may install the sign lighting controls than the responsible person installing the sign lighting power.
2. The Mandatory Measures (sign lighting controls) are required for compliance with the sign lighting Standards. If the person responsible for installing the sign lighting power is not also responsible for the sign lighting controls, then the owner of the sign, general contractor, or architect shall be responsible to have the sign lighting controls installed.
3. If more than one person has responsibility for compliance, each responsible person shall prepare and sign a Certificate of Compliance and an Installation Certificate applicable to the portion of construction for which they are responsible; alternatively, the person with chief responsibility for construction shall prepare and sign the Certificate of Compliance Declaration Statement for the entire construction.

**3a. Statements of Responsibility:** Any person signing the Certificate of Compliance Declaration Statement on page 1 of 4 on this SLTG-1C shall complete Part 3a. Check Yes or No for all of the following statements:

1	I have responsibility for installing the sign lighting controls <input type="checkbox"/> Yes, complete parts 3a and 3b of this form <input type="checkbox"/> No, complete part 3a of this form
2	There are no existing sign lighting controls and I will be installing compliant sign lighting controls <input type="checkbox"/> Yes <input type="checkbox"/> No
3	There are no existing sign lighting controls and someone else will be responsible to install compliant sign lighting controls <input type="checkbox"/> Yes <input type="checkbox"/> No
4	There are existing sign lighting controls that do not comply with the applicable provision of §119 and §133 and I will be installing compliant sign lighting controls <input type="checkbox"/> Yes <input type="checkbox"/> No
5	There are existing sign lighting controls that do not comply with the applicable provision of §119 and §133 and someone else will be responsible to install compliant sign lighting controls <input type="checkbox"/> Yes <input type="checkbox"/> No

**3b. Mandatory Sign Lighting Controls**

If the person signing the Certificate of Compliance Declaration Statement on page 1 of 4 of this SLTG-1C is responsible for complying with the sign lighting control requirements, that person shall answer all of the following questions:

If there are construction documents, indicate where on the building plans the mandatory measures (sign lighting control) note block can be located:

1	<b>§133(a)1.</b> All <b>indoor sign</b> lighting is controlled with an automatic time switch control that complies with the applicable requirements of §119.	Y <input type="checkbox"/>	N <input type="checkbox"/>	NA <input type="checkbox"/>
2	<b>§133(a)1 and 2.</b> All <b>outdoor sign</b> lighting is controlled with an automatic time switch control plus a photo control, or an outdoor astronomical time switch, that comply with the applicable requirements of §119.	Y <input type="checkbox"/>	N <input type="checkbox"/>	NA <input type="checkbox"/>
	<b>Exception to §133(a)2.</b> Outdoor signs in tunnels or large covered areas that require illumination during daylight hours.	Y <input type="checkbox"/>		NA <input type="checkbox"/>
3	<b>§133(a)3.</b> All outdoor signs are controlled with a dimmer that provides the ability to automatically reduce sign power by a minimum of 65 percent during nighttime hours.	Y <input type="checkbox"/>	N <input type="checkbox"/>	NA <input type="checkbox"/>
	<b>Exception 1 to §133(a)3.</b> Signs illuminated for less than one hour per day during daylight hours.	Y <input type="checkbox"/>		NA <input type="checkbox"/>
	<b>Exception 2 to §133(a)3.</b> Outdoor signs in tunnels or large covered areas that require illumination during daylight hours.	Y <input type="checkbox"/>		NA <input type="checkbox"/>
	<b>Exception 3 to §133(a)3.</b> Only metal halide, high pressure sodium, cold cathode, or neon lamps used for illuminating signs or parts of signs.	Y <input type="checkbox"/>		NA <input type="checkbox"/>
4	<b>§133(a)4.</b> An Electronic Message Center (EMC) having a new connected lighting power load greater than 15 kW has a control installed capable of reducing the lighting power by a minimum of 30 percent when receiving a demand response signal that is sent out by the local utility.	Y <input type="checkbox"/>	N <input type="checkbox"/>	N/A <input type="checkbox"/>
	<b>Exception to §133(a)4.</b> EMC required by a health or life safety statute, ordinance, or regulation, including but not limited to exit signs and traffic signs.	Y <input type="checkbox"/>		NA <input type="checkbox"/>

Field Inspector Notes:

**Certificate of Compliance (Sign Lighting)****(Page 3 of 4)****SLTG-1C**

Project Name:

Date:

**4. Maximum Allowed Lighting Power Method of Compliance****Certificate of Compliance and Field Inspection Energy Checklist**

Complete this part if there are signs using the maximum allowed lighting power method of compliance. (Complete part 5 of this Certificate of Compliance if there are signs using the Specific lighting sources method of compliance)

A	B	C	D	E	F	G	H	I	J
Symbol or Code	Description	OPTIONAL - ENERGY VERIFIED label (see instructions below) ✓	Allowed Watts				Design Watts	Complies? Y / N	Field Inspector Check that Sign Complies ✓
			Sign Area (ft <sup>2</sup> )	Internally (I) or Externally (E) Illuminated	Allowed LPD (I = 12 W/ft <sup>2</sup> ) (E = 2.3 W/ft <sup>2</sup> )	Allowed Watts = D x F	Total Installed watts for sign	Complies if H ≤ G	
		<input type="checkbox"/>							<input type="checkbox"/>
		<input type="checkbox"/>							<input type="checkbox"/>
		<input type="checkbox"/>							<input type="checkbox"/>
		<input type="checkbox"/>							<input type="checkbox"/>
		<input type="checkbox"/>							<input type="checkbox"/>
		<input type="checkbox"/>							<input type="checkbox"/>
<b>A</b>	Symbol or code used on the plans (when plans are required) and other documents.								
<b>B</b>	A narrative description of the sign, or location of sign on the building; and the location of sign on construction documents.								
<b>C</b>	OPTIONAL - Check this box only if this sign has a permanent, pre-printed, factory-installed, <b>ENERGY VERIFIED</b> label, confirming that the sign complies with the Section 148 of the California 2008 Title 24, Part 6 Standards, using the Maximum Allowed Lighting Power method of compliance. <b>The only labels that will be recognized for this purpose are ENERGY VERIFIED Certification Marks authorized by Underwriters Laboratories (UL) or other Product Certification Body accredited to ISO/IEC Guide 65 by the American National Standards Institute in accordance with ISO/IEC 17011. Surveillance by the Accredited Certification Body shall be an ongoing annual inspection program carried out by a Type A Inspection body in accordance with ISO/IEC 17020.</b> For signs with such an ENERGY VERIFIED label, columns 'D' through 'I' are not required to be filled out. Note: Using an ENERGY VERIFIED label is an optional method to validate compliance. An ENERGY VERIFIED label is not needed for compliance.								
<b>D</b>	The sign area in square feet.								
<b>E</b>	List "I" if the sign is internally illuminated. List "E" if the sign is externally illuminated.								
<b>F</b>	Allowed watts per square foot. Enter 12 if the sign is listed as "I" in column E. Enter 2.3 if sign is listed as "E" in column E.								
<b>G</b>	Multiply the square footage in column D times the allowed Lighting Power Density (LPD = watts) in column F.								
<b>H</b>	Show the total installed watts in the sign, as determined according to the applicable provisions of §130(d or e).								
<b>I</b>	Enter Y if the number in column H is less than or equal to the number in column G. Otherwise, the sign does not comply.								
<b>J</b>	This page doubles as a field inspection checklist.								
Field Inspector Notes:									

**Certificate of Compliance (Sign Lighting)****(Page 4 of 4)****SLTG-1C**

Project Name:

Date:

**5. Specific Lighting Source Method of Compliance****Certificate of Compliance and Field Inspection Energy Checklist**

Complete this part if there are signs using the Specific lighting source method of compliance. (Complete part 4 of this Certificate of Compliance if there are signs using the maximum allowed lighting power method of compliance)

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>			
Symbol or Code	Description	<b>OPTIONAL ENERGY VERIFIED</b> label (see instructions below) ✓	Specific light source used for compliance Shall include only lighting technologies listed below List all that apply	Field Inspector Check that Sign Complies ✓			
		<input type="checkbox"/>		<input type="checkbox"/>			
		<input type="checkbox"/>		<input type="checkbox"/>			
		<input type="checkbox"/>		<input type="checkbox"/>			
		<input type="checkbox"/>		<input type="checkbox"/>			
		<input type="checkbox"/>		<input type="checkbox"/>			
<b>A</b>	Symbol or code used on the plans (when plans are required) and other documents.						
<b>B</b>	A narrative description of the sign, or location of sign on the building; and the location of sign on construction documents						
<b>C</b>	<b>OPTIONAL</b> - Check this box only if this sign has a permanent, pre-printed, factory-installed <b>ENERGY VERIFIED</b> label, confirming that this sign complies with the Section 148 of the California 2008 Title 24, Part 6 Standards, using the Specific Lighting Source Method of Compliance. <b>The only labels that will be recognized for this purpose are ENERGY VERIFIED Certification Marks authorized by Underwriters Laboratories (UL) or other Product Certification Body accredited to ISO/IEC Guide 65 by the American National Standards Institute in accordance with ISO/IEC 17011. Surveillance by the Accredited Certification Body shall be an ongoing annual inspection program carried out by a Type A Inspection body in accordance with ISO/IEC 17020.</b> For signs with such an ENERGY VERIFIED label, column 'D' is not required to be filled out. Note: Using an ENERGY VERIFIED label is an optional method to validate compliance. An ENERGY VERIFIED label is not needed for compliance.						
<b>D</b>	Specific Light Source Compliance Method. The sign(s) identified above use only the following lighting technologies: List all applicable numbers (1 through 10) that apply in column D above for each row.						
	1	High pressure sodium lamps					
	2	Pulse start or ceramic metal halide lamps served by a ballast with $\geq 88\%$ efficiency					
	3	Pulse start metal halide lamps that are $\leq 320$ watts, are not 250 watt or 175 watt lamps, and are served by a ballast with $\geq 80\%$ efficiency					
	4	Neon or cold cathode lamps with transformer or power supply efficiency $\geq 75\%$ with rated output current $< 50$ mA					
	5	Neon or cold cathode lamps with transformer or power supply efficiency $\geq 68\%$ with rated output current $\geq 50$ mA					
	6	Fluorescent lamps with a minimum color rendering index (CRI) of 80 (Note: when using electronic ballasts for compliance, lamps with a CRI $< 80$ may be used)					
	7	Light emitting diodes (LEDs) with a power supply with $\geq 80\%$ efficiency					
	8	Single voltage LED external power supplies designed to convert 120 volt AC input into lower voltage DC or AC output, having a nameplate output power less than or equal to 250 watts, and certified to the Energy Commission as complying with the applicable requirements of the Appliance Efficiency Regulations (Title 20)					
	9	Compact fluorescent lamps that do not contain a medium screw base sockets (E24/E26)					
	10	Electronic ballasts with a fundamental output frequency $\geq 20$ kHz					
<b>E</b>	This page doubles as a field inspection checklist.						
Field Inspector Notes:							